

Connecticut



Friends of Conte Refuge

Pine Brook on the Proposed Salmon Brook Division, Connecticut

State of Connecticut

- Farmington River Conservation Focus Area (Proposed)
- Maromas Conservation Focus Area (Proposed)
- Pyquag Conservation Focus Area (Proposed)
- Salmon Brook Conservation Focus Area (Proposed)
- Salmon River Conservation Focus Area (Existing Refuge Division)
- Scantic Conservation Focus Area (Proposed)
- Whalebone Cove Conservation Focus Area (Existing Refuge Division)
- Dead Man's Swamp Unit (Existing Refuge Unit)
- Roger Tory Peterson Unit (Existing Refuge Unit)

Overview Farmington River Conservation Focus Area (Proposed)

Colebrook, Connecticut and Sandisfield, Massachusetts

Conservation Focus Area (CFA)—Acreage Profile	Acres	Percentage of CFA
Total CFA Acres to be Conserved by Service	8,866	89.2 %
■ Existing Refuge Ownership in CFA ¹	0	
■ Additional Acres in CFA proposed for Refuge Acquisition ²	8,866	
Existing Acres in CFA Permanently Conserved by Others ^{2,3}	1,072	10.8 %
Total Acres in CFA ^{2,4}	9,938	100 %

¹Acres from Service's Realty program (surveyed acres); ²Acres calculated using GIS; ³The Service does not plan to acquire existing conserved lands, except under extenuating circumstances (conserved acres from TNC 2010 data);

⁴The Service would conserve up to this number of acres. The Service only acquires lands from willing sellers.

What specific criteria and/or considerations drove the selection of this CFA?

The Farmington River was an SFA in the 1995 FEIS. The proposed Farmington River CFA is located in an area identified by the State of Connecticut as a priority for conservation. The proposed CFA is surrounded by a network of existing conserved lands including Tunxis State Forest (CT), Algonquin State Forest (CT), Granville State Forest (MA), Sandisfield State Forest (MA), Connecticut Metropolitan District Commission's Farmington River Watershed lands, and numerous other privately conserved lands. Additional land protection by the Service in this area will help better connect these conserved lands. The area's habitat is currently structurally and functionally sound and is projected to be resilient to climate change.

What are the priority habitat types within the proposed CFA? What percentage of the total CFA acreage do they represent?

- Hardwood Forest – 80.7%
- Freshwater Marsh – 0.6%
- Shrub swamp and floodplain forest – 0.8%

For more information on habitats in the CFA, see map A.4 and table A.2.

What are the resources of conservation concern for the proposed CFA?

As noted in table A.3 below, there are eight priority refuge resources of concern (PRRC) terrestrial and aquatic species that may rely upon the diverse habitats in this CFA, including a Federal candidate species. There are also habitat types that are not being managed for a particular PRRC species, but are important for their contribution to Biological Integrity Diversity and Environmental Health (BIDEH) of the landscape. The refuge will seek to protect and restore (if necessary) these habitat types. Additionally, we recognize the value of this area to State Species of Greatest Conservation Need (SGCN) and forest interior dwelling bird species. These species and others are discussed further below.

1. Federal Threatened and Endangered Species

The Farmington River CFA occurs within two of the 49 New England cottontail Focus Areas (NECFA) which span six states. These focus areas are locations to manage and restore habitat for New England cottontail. New England cottontail is a candidate species for listing under the Endangered Species Act, and is a species of greatest conservation need in Connecticut. "A Conservation Strategy for the New

England cottontail” was developed and approved in November 2012, and provides the conservation and habitat management goals and strategies for this species (Fuller and Tur 2012). We plan to work with partners and adjacent landowners to identify areas appropriate for New England cottontail management. We will manage approximately 375 acres of forest in early successional habitat for New England cottontail in the CFA. This approximation of the amount and distribution of acreage over the next 15 years assumes we would have a large enough land base to manage. Our target acreage may also be refined once site conditions are verified and a habitat management plan is completed.

American eel spend the majority of their young life in freshwater systems. American eel enter the Connecticut River as juveniles, and migrate upstream to inhabit streams, lakes, and ponds. Eels feed in these aquatic habitats until they reach sexual maturity and begin the long migration to their spawning grounds in the Sargasso Sea (ASMFC 2000).

2. Migratory Birds

The Connecticut River watershed is a major migration corridor for birds. The lower portion of the watershed (CT and MA) receives higher use by migrants, with this use concentrated in habitats along the Connecticut River main stem. Migrants are also known to use habitats beyond the Connecticut River main stem within the watershed, though in lower concentrations (Smith College 2006). The Farmington River CFA is less than 20 miles from the Connecticut River and contains large tracts of forested and riparian habitat. These habitats provide stopover areas for a diversity of species including wood thrush, Canada warbler, black-throated blue warbler, black-throated green warbler, red-eyed vireo, American redstart, and yellow-bellied sapsucker (Smith College 2006). This CFA also provides breeding habitat for a diversity of bird species.

The PRRC bird species for the Farmington River CFA includes wood thrush, chestnut-sided warbler and Canada warbler. This CFA is located within their core breeding range, and the contiguous forests provide breeding habitat for these and other priority conservation concern species. Habitats also support nesting and migrating bald eagle populations, which is another PRRC species.

3. Waterfowl

Potential breeding and foraging habitat for American black duck (a PRRC species), wood duck, Canada geese, and other waterfowl species within wetlands adjacent to slow moving streams and open water habitats.

4. Diadromous fish and other aquatic species

PRRC species in the Farmington River CFA include American eel, a species petitioned for listing under the Endangered Species Act, and Eastern brook trout. These species are also State SGCN and a conservation priority for the Service’s northeast region. The Farmington River supports the highest diversity of mussels in the Connecticut River watershed, though the majority of these occurrences are in the lower reaches. The West Branch of the Farmington River occurs along the eastern boundary of the Farmington River CFA. This branch was damned by the Army Corps of Engineers for flood control, creating Colebrook Lake Reservoir and West Branch Reservoir. These reservoirs are stocked with trout to complement the occurrence of bass, pickerel, perch, brown bullhead, and bluegill. The CTDEEP also stocks Atlantic salmon fry into Sandy Brook, which is within the CFA, as part of its Atlantic Salmon Legacy Program. Future restoration of other diadromous species, such as sea lamprey is being proposed by CTDEEP once aquatic species passage is provided at the Collinsville dams.

5. Wetlands

The Farmington River CFA contains 175 acres of hardwood swamp, 90 acres of conifer swamp, 81 acres shrub-swamp and floodplain forest, and 63 acres of freshwater marsh. Many of these wetlands occur along slow moving streams or small ponds. Habitat patches range from 2 acres to 63 acres in size.

What habitat management activities would likely be a priority on refuge lands within the proposed CFA?

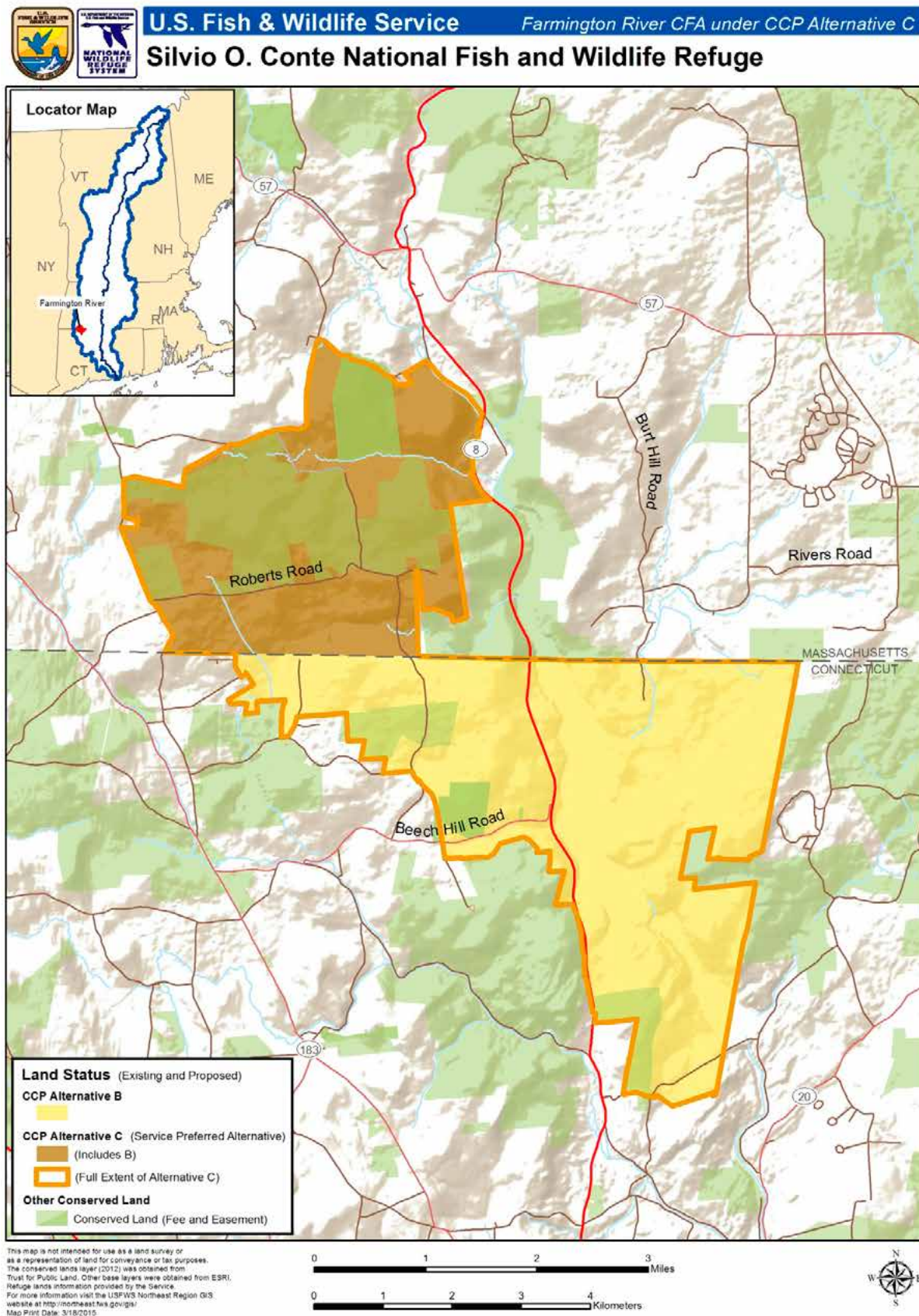
We will conduct a comprehensive, multi-scale wildlife habitat inventory following acquisition. Baseline information on the condition of habitats (i.e., forested, non-forested and open water habitats) will further inform more detailed, habitat prescriptions within a required step-down Habitat Management Plan (HMP). Once inventory has been completed, then management will focus on maintaining the following conditions:

- Forest management activities will provide diversity of seral stages including early successional and mature forested habitats. The forests in the CFA will be structurally diverse (different size classes) and native species will dominate. Appendix J provides general forest management guidelines, including descriptions of forestry techniques and explanations about how we will determine where and how to conduct active management.
- We will also manage wetland habitats, and pasture, hay, grassland habitats. Wetland management will focus on maintaining the natural hydrology and native species composition. Invasive plant management will be a priority.
- Open water (i.e., stream, rivers, and ponds) will focus on maintaining forested stream buffers, a structurally diverse instream habitat, and clear aquatic species passage to spawning and wintering habitat.

What public use opportunities would likely be a priority on refuge lands within the proposed CFA?

We would focus on providing opportunities for the six priority wildlife-dependent recreational uses: hunting, fishing, wildlife observation and photography, environmental education, and interpretation.

Map A.3. Farmington River CFA – Location.



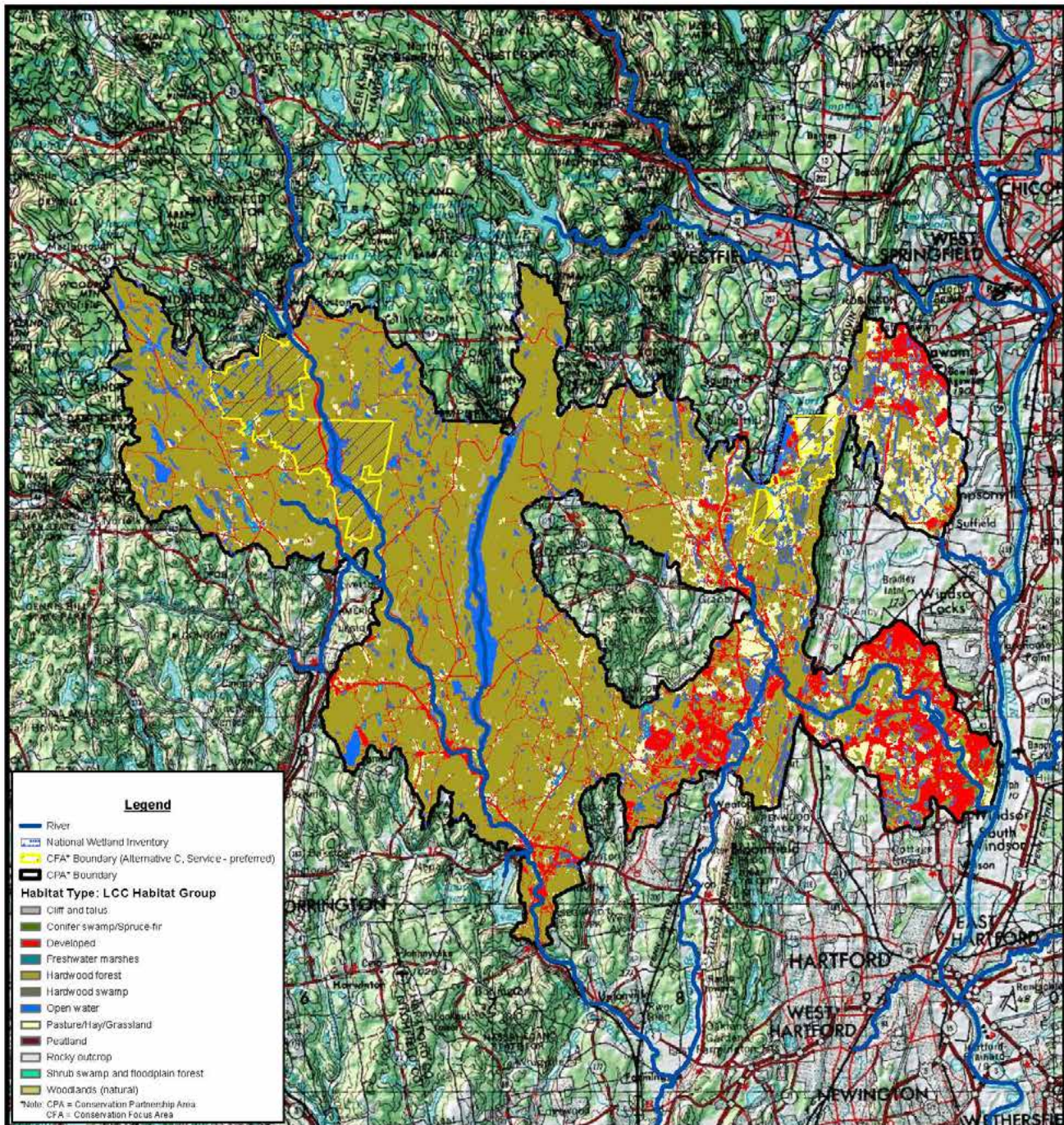
Map A.4. Farmington River CPA/CFA – Habitat Types.



U.S. Fish & Wildlife Service

Habitat Types: Farmington River CPA* - MA

Silvio O. Conte National Fish and Wildlife Refuge



This map is designed for refuge management.
It is not intended for use as a land survey or
as a representation of land for conveyance or tax purposes.
For more information visit the USFWS Northeast Region GIS
website at <http://northeast.fws.gov/gis/>
Date: 7/2/2013

0 2 4 6 8
Miles



Table A.2. Farmington River CPA/CFA – Habitat Types.

LCC General Habitat Type ¹	CPA ²		CFA ³			
	Total Acres	Percent of CPA ⁴	Total Acres	Conserved by Others ⁵	USFWS Owned ⁶	Percent CFA ⁷
Forested Uplands and Wetlands⁹						
Conifer swamp/spruce-fir	368	0.2%	90	2	0	0.9%
Hardwood forest	126,414	68.2%	8,021	1,009	0	80.7%
Hardwood swamp	8,355	4.5%	175	3	0	1.8%
Shrub swamp and floodplain forest	1,392	0.8%	81	0	0	0.8%
Woodlands (natural)	483	0.3%	80	18	0	0.8%
<i>Forested uplands and wetlands subtotal</i>	<i>137,013</i>	<i>73.9%</i>	<i>8,447</i>	<i>1,032</i>	<i>0</i>	<i>85.0%</i>
Non-forested Uplands and Wetlands⁹						
Cliff and talus	603	0.3%	88	8	0	0.9%
Freshwater marshes	804	0.4%	63	0	0	0.6%
Pasture/hay/grassland	16,907	9.1%	112	7	0	1.1%
Peatland	31	0.0%	0	0	0	0.0%
Rocky outcrop	25	0.0%	4	0	0	0.0%
<i>Non-forested uplands and wetlands subtotal</i>	<i>18,370</i>	<i>9.9%</i>	<i>267</i>	<i>16</i>	<i>0</i>	<i>2.7%</i>
Inland aquatic habitats⁹						
Open Water	6,498	3.5%	884	0	0	8.9%
<i>Inland aquatic habitats subtotal</i>	<i>6,498</i>	<i>3.5%</i>	<i>884</i>	<i>0</i>	<i>0</i>	<i>13.6%</i>
Other						
Developed	23,550	12.7%	339	9	0	3.4%
<i>Other subtotal</i>	<i>23,550</i>	<i>12.7%</i>	<i>339</i>	<i>9</i>	<i>0</i>	<i>3.4%</i>
TOTAL	185,430	100.0%	9,938	1,056	0	100.0%

**All acreages are based upon GIS analysis and should be considered estimates

1 - North Atlantic Landscape Conservation Collaborative general habitat typings for USFWS representative species; linked to the National Vegetation Classification System (NVCS). See table A.52 at the end of this appendix for a comparison of these generalized habitat types with the more specific The Nature Conservancy's Northeastern Terrestrial Habitat Classification System. More detailed habitat tables that include the Northeastern Terrestrial Habitat Classification System habitat types are available for each CFA and refuge unit online at: http://www.fws.gov/refuge/Silvio_O_Conte/what_we_do/conservation.html.

2 - Conservation Partnership Area

3 - Conservation Focus Area; representing Service - preferred Alternative C

4 - Percentage of the CPA represented by the habitat type

5 - Acres in the CFA currently conserved by others (TNC 2012)

6 - Acres in the CFA currently owned by the USFWS

7 - Percentage of the CFA represented by the habitat type

8 - Percentage of a given habitat within the CPA protected within the CFA under Alternative C

9 - CCP Objective from Silvio O. Conte NFWR Draft CCP/EIS, Chapter 4, Alternative C-Service's Preferred Alternative

Table A.3. Farmington River CFA – Preliminary Priority Refuge Resources of Concern

Priority Refuge Resources of Concern ¹	Habitat Structure ²	Associated Species ³
Forested Uplands and Wetlands⁴		
Hardwood Forest⁵ - 8,021 acres		
Wood Thrush^{A, B, C}	Breeding habitat includes contiguous mature forests (80+ years old) dominated by deciduous tree species, moist soils, a moderate to dense sub-canopy and shrub density, open forest floor and closed canopy (Roth et al. 1996, Rosenberg et al. 2003).	American Redstart ^{A,I,J} Black-billed Cuckoo ^{A,I,J} Broad-winged hawk ^{I,J,K} Eastern Wood-pewee ^{A,I,J} Sharp-shinned Hawk ^{I,J,K} Eastern Red Bat^K Ovenbird^A
Canada Warbler ^{A, B, C}	Breeding habitat includes contiguous deciduous, mixedwood and coniferous forests interspersed with openings that provide an average overstory tree height of 55 ft within >30% canopy closure, a dense foliar mid-story and well developed shrub layer 7-20' in height, and moist soils (Chace et al. 2009, Lambert et al. 2005, Dunn et al. 1997).	Red-shouldered Hawk ^{I,J} Barred Owl ^I Eastern Box Turtle ^I Blue-headed Vireo ^I Scarlet Tanager ^{I,J} Black-and-white Warbler ^{I,J} Baltimore Oriole ^{I,J} Jefferson Salamander ^{I,J,K} Northern Flicker ^{A,I,J} Rose-breasted Grosbeak ^{A,I} Black-throated Blue Warbler ^{A,I} Black-throated Green Warbler ^{A,I} Black Bear ^{I,K} Prairie Warbler ^I Ruffed Grouse ^{A,I,K} Eastern Towhee ^I Louisiana Waterthrush^{I,K} Yellow-bellied Sapsucker ^{A,I} Brown Thrasher ^K
New England Cottontail ^{B, D}	Year round habitat includes dense, young deciduous and mixed forests in patch sizes of 25 acres or more that are situated within 1 km of each other (Arbuthnot 2008, DeGraaf et al. 2001).	
Chestnut-sided Warbler^{A, B, K}	Early successional deciduous forested upland and wetland habitat (Dunn et al. 1997, Richardson et al. 1995)	
Bald Eagle ^{C, G}	Breeding habitat includes large bodies of water with little human disturbance, and large canopy trees or other elevated sites for nesting, perching, and roosting (DeGraaf et al. 2001).	
Hardwood Swamp⁵ - 175 acres		
Canada Warbler ^{A, B, C}	Breeding habitat includes contiguous deciduous, mixedwood and coniferous forests interspersed with openings that provide an average overstory tree height of 55 ft within >30% canopy closure, a dense foliar mid-story and well developed shrub layer 7-20' in height, and moist soils (Chace et al. 2009, Lambert et al. 2005, Dunn et al. 1997).	Northern Waterthrush Red-shouldered Hawk ^{I,J} Veery ^{A,I,J} White-eyed Vireo ^J Wood Duck ^A Northern Parula ^{A,I,K} Black-throated Green Warbler ^{A,I} Purple Finch ^{A,I} Blackburnian Warbler ^{A,I}
Conifer Swamp⁵ - 90 acres		
Canada Warbler ^{A,B,C}	Breeding habitat includes contiguous deciduous, mixedwood and coniferous forests interspersed with openings that provide an average overstory tree height of 55 ft within >30% canopy closure, a dense foliar mid-story and well developed shrub layer 7-20' in height, and moist soils (Chace et al. 2009, Lambert et al. 2005, Dunn et al. 1997).	Red-shouldered Hawk ^{I,J} Veery ^{A,I,J} White-eyed Vireo ^J Wood Duck ^A Northern Parula ^{A,I,K} Black-throated Green Warbler ^{A,I} Purple Finch ^{A,I} Blackburnian Warbler ^{A,I}

Priority Refuge Resources of Concern ¹	Habitat Structure ²	Associated Species ³
Forested Uplands and Wetlands⁴		
Shrub Swamp and Floodplain Forest⁵ - 81 acres		
American Black Duck ^{A, B, C, G}	Breeding and migrating habitat includes herbaceous wetlands, fens, and flooded meadows and shrub-swamps (Longcore et al. 2000, DeGraaf et al. 2001).	Chestnut-sided Warbler ^{A,I} Ruffed Grouse ^{A, I, K} Eastern Ribbon Snake ^K Warbling Vireo^I Spotted Turtle^K
New England Cottontail ^{B, D}	Year round habitat includes shrub swamps of at least 25 acres that are within 1 km of other shrub swamps, and early successional forest patches (Arbuthnot 2008, DeGraaf et al. 2001).	American Redstart ^{A,I, J} Eastern Kingbird ^{I,J} Gray Catbird ^{I,J} Eastern Towhee ^{I,K} White-throated Sparrow ^K Wood Duck ^A Willow Flycatcher^{I,K} Black Racer ^K American Woodcock ^{A,I,J}
Woodlands (natural)⁵ - 80 acres		
Central Appalachian pine-oak rocky woodland ^H	This system of the central Appalachians encompasses open or sparsely wooded hilltops and outcrops or rocky slopes. The substrate rock is granitic or of other acidic lithology. The vegetation is patchy, with woodland as well as open portions. Pine species are indicative and often are mixed with Oak species. Some areas have a fairly well-developed heath shrub layer; others a grass layer. Conditions are dry and nutrient-poor; and many, if not most, sites have a history of fire (Gawler 2008).	Uncommon plant community within the landscape that contributes to BIDEH*
Non-Forested Uplands and Wetlands⁴		
Freshwater Marshes⁵ - 63 acres		
American Black Duck ^{A, B, C, G}	Breeding and migrating habitat includes herbaceous wetlands, fens, and flooded meadows and shrub-swamps (Longcore et al. 2000, DeGraaf et al. 2001).	Marsh Wren^K American Bittern^{A,I,K} Eastern Ribbon Snake ^{I,K} Northern Harrier ^{A,I,J,K} Spotted Turtle ^{I,K} Bridle Shiner ^{I,K} Canada Goose ^{A,J} Wood Duck ^J
Pasture/Hay/Grassland⁵ - 112 acres		
New England Cottontail ^{B, D}	Year round habitat includes pastures, abandoned fields, and dense, young deciduous and mixed forests in patch sizes of 25 acres or more that are situated within 1 km of each other (Arbuthnot 2008, DeGraaf et al. 2001).	Field Sparrow ^{I,J,K} Northern Harrier ^{A,I,J,K} Grasshopper Sparrow^I Prairie Warbler ^{I,K} Bobolink^{A,I} Eastern Meadowlark^I American Woodcock ^{A,I,J}

Priority Refuge Resources of Concern ¹	Habitat Structure ²	Associated Species ³
Non-Forested Uplands and Wetlands⁴		
Cliff and Talus⁵ – 88 acres		
<p>North-central Appalachian acidic cliff and talus^H</p> <p>North-central Appalachian circumneutral cliff and talus^H</p>	<p>The <i>North Central Appalachian acidic cliff and talus system</i> comprises sparsely vegetated to partially wooded cliffs. Most of the substrate is dry and exposed, but small (occasionally large) areas of seepage are often present. Vegetation in seepage areas tends to be comparatively well-developed and different from the surrounding dry cliffs. The vegetation is patchy and often sparse, punctuated with patches of small trees that may form woodlands in places. Eastern red cedar is a characteristic tree species, poison ivy a characteristic woody vine, and common polypody a characteristic fern. Substrates within the <i>circumneutral cliff and talus system</i> include limestone, dolomite and other rocks. The vegetation varies from sparse to patches of small trees, in places forming woodland or even forest vegetation. Ash, basswood, and American bladdernut are woody indicators of the enriched setting. The herb layer includes at least some species that are indicators of enriched conditions, e.g., yellow jewelweed, purple cliffbrake, ebony spleenwort, or bluntlobe cliff fern (Gawler 2008).</p>	<p>Uncommon plant community within the landscape that contributes to BIDEH*</p>
Rocky Outcrop⁵ – 4 acres		
<p>Northern Appalachian-Acadian rocky heath outcrop^H</p>	<p>The Northern Appalachian-Acadian rocky heath outcrop system occurs on ridges or summits of erosion-resistant acidic bedrock. The vegetation is patchy, often a mosaic of woodlands and open glades. Red oak and various conifers, including White pine and Red spruce, are characteristic trees. Low heath shrubs, including Sheep laurel, Low-bush blueberry, Black huckleberry, and Black chokeberry are typically present. Exposure and occasional fire are the major factors in keeping the vegetation relatively open (Gawler 2008).</p>	<p>Uncommon plant community within the landscape that contributes to BIDEH*</p>

Priority Refuge Resources of Concern ¹	Habitat Structure ²	Associated Species ³
Inland Aquatic Habitats⁴		
Water⁵ – 884 acres		
American Eel^{E, F}	Migrating and feeding habitat includes lakes, streams and large rivers (USFWS 1996)	Burbot ^{I, K} Eastern Silvery Minnow ^K Longnose Dace ^{I, K}
Brook Trout^{B, F}	Spawning habitat includes clear, well oxygenated cold water lakes/ponds/streams with silt-free rocky substrate, abundant cover, vegetated banks, stable temperatures and stream flow (VTWAP 2005).	Longnose Sucker ^{I, K} Creek Chubsucker ^{I, K} Harpoon Clubtail ^{I, K} Rapids Clubtail ^{I, K} Riverine Clubtail ^{I, K}

1 - These species of conservation concern and associated habitats, as well as under-represented and sensitive ecological systems constitute the management focus for the CFA, and recommended for the CPA. They were identified based on specific criteria, and are included in the following plans, databases and/or have Federal status.

A: 2008 Bird Conservation Region 14.

B: 2009 North Atlantic Landscape Conservation Cooperative Development and Operations Plan.

C: 2008 USFWS Birds of Conservation Concern.

D: Federal Threatened and Endangered status as of 2010, including Candidate Species

E: Federal Elevated Concern species or species petitioned for threatened and endangered listing as of 2010

F: 2009-2013 USFWS Northeast Region Fisheries Program Strategic Plan

G: Silvio O Conte Refuge Purpose Species.

H: 2008 Northeastern Terrestrial Habitat Classification System.

2 - This habitat structure will benefit the listed priority refuge resources of concern, and is based on the most recent literature.

3 - These species are a compilation from the following plans, and are associated with the habitat type and/or will benefit from all or a portion of the habitat structure associated with the priority species. This is not a comprehensive list of species.

A: 2008 Bird Conservation Region 14.

I: 2005 Connecticut Comprehensive Wildlife Conservation Strategy

J: 2012 Terrestrial and Wetland Representative Species of the North Atlantic: Species Selected, Considered, and Associated Habitats (Ecological Systems). These species were LCC candidate species and are represented by the selected LCC Representative Species.

K: 2005 Massachusetts Comprehensive Wildlife Conservation Strategy

4 - CCP Objectives from Silvio O. Conte NFWR Comprehensive Conservation Plan, Chapter 4, Service - preferred Alternative.

5 - These habitat types are based on the North Atlantic Landscape Conservation Cooperative (NALCC) habitat groupings for associated Representative Species, which were derived from The Northeastern Terrestrial Habitat Classification System (NETHCS). See table A.52 for a comparison of the NALCC habitat groupings and NETHCS.

BOLD - These species are LCC Representative Species, which is a species that, because of its habitat use, ecosystem function, or management response, typifies lifecycle or habitat requirements for a larger group of species.

* The Refuge Improvement Act directs the US Fish and Wildlife Service to maintain Biological Integrity, Diversity, and Environmental Health (BIDEH). Elements of BIDEH are represented by native fish, wildlife, plants and their habitats as well as those ecological processes that support them.

Goals, Objectives, and Strategies for Refuge Lands in the Farmington River CFA under Alternative C

Goal 1: Wildlife and Habitat Conservation: Promote the biological diversity, integrity, and resiliency of terrestrial and aquatic ecosystems within the Connecticut River watershed in an amount and distribution that sustains ecological function and supports healthy populations of native fish, wildlife, and plants, especially Federal trust species of conservation concern, in anticipation of the effects of climate, land use, and demographic changes.

Objective 1.1: Forested Uplands and Wetlands

Sub-objective 1.1a. (Hardwood Forest)

Improve the diversity of seral stages and (where and when possible) restore historic composition and structure, and improve landscape connectivity of hardwood forest habitat to support species of conservation concern and aid in climate change adaptation. Management will provide breeding and foraging habitat for priority refuge resources of concern, including wood thrush, chestnut-sided warbler, Canada warbler, New England cottontail, and bald eagle.

Rationale:

We envision healthy forests within the Farmington River CFA where a diverse seral structure provides suitable breeding and post-breeding habitat conditions for a suite of Connecticut and Massachusetts wildlife. Our long-term vision for the CFA includes hardwood forests characterized by complex horizontal and vertical structure, a generally closed canopy, large-diameter trees, dead woody material, snags and cavity trees, native species diversity, softwood inclusions, and a diversity of wildlife (Foster et al. 1996, Goodburn and Lorimer 1998, Keeton 2006, D'Amato et al. 2009, Curzon and Keeton 2010, Fraver et al. 2011).

Farmington River CFA hardwood forests are diverse and productive for wildlife, and abundant, high-quality habitat is certainly available within the CFA. To date our review of the Farmington River CFA habitats and wildlife species—and their condition—has been limited to coarse-scale information: the careful analysis of spatially-explicit habitat data using GIS, the consultation of local, state, and regional species conservation plans, and an understanding of forest disturbance and land-use history in New England. This allowed identification of broad habitat types, and species of conservation concern known to use characteristics common to these habitats. Our understanding of the forest structure within the Farmington River CFA comes exclusively from a reading of forest history in New England—a legacy of intensive past-use that altered the vegetation structure and composition, landscape patterns, and ongoing ecological dynamics (Cronon 1983, Whitney 1996, Foster et al. 1997, Bellemare et al. 2002, Hall et al. 2002). Our sub-objective assumes the forests of the Farmington River are more homogeneous than those of three centuries earlier, and include more sprouting and shade-intolerant species and fewer long-lived mature forest tree species (Goodburn and Lorimer 1998, Foster et al. 1998, Foster 2000, Bellemare et al. 2002, Cogbill et al. 2002, Abrams 2003). Completing a comprehensive forest and habitat inventory post-acquisition will test these assumptions, and aid in identifying stands where a forest management approach that combines passive management and the application of silvicultural treatments designed to emulate gap dynamics, will promote compositional and structural diversity, and move succession forward to emulate later seral stage characteristics.

For many woodland species, the ability to survive and breed is often related to the presence of specific forest structural conditions or attributes, such as those that provide nest sites, food and foraging substrates, singing perches, and cover from predators. While our management goals may create a relatively old forest, hardwood forests within the Farmington River CFA will contain a variety of patches in different size classes and developmental stages; it is not uniform throughout. This diversity of size classes provides a variety of species with a range of nesting and foraging opportunities. Further, finer-scale investigation of forest conditions may identify opportunities to improve size class diversity through the creation of early-successional forests—habitat in decline in portions of the watershed. The USFWS New England cottontail initiative has identified focus areas, including the Farmington CFA, where the decline in early successional habitats is a particular problem for the New England cottontail. New England cottontail is petitioned for listing under the ESA, and is a species of greatest conservation need in Connecticut and Massachusetts.

The conceptual model for the conservation of New England cottontail is for a focus area to contain at least 1,000 acres of early successional habitat of 15 or more habitat patches, several of which are 25 acres or more. Each habitat patch should be one mile or less from each other to aid in New England cottontail movement between patches (Fuller et al 2012). Approximately, 375 acres of forest will be managed in early successional habitat in support of New England cottontail in the CFA. Another species of conservation concern that will use these habitat patches is American woodcock. High quality woodcock habitat includes young forest patches within a mile of feeding areas. New England cotton tail habitat patches will be placed in the vicinity of shrub wetlands, where feasible, to benefit this species. If early successional habitat is lacking within the landscape, we will provide other strategically located patches with these conditions to support other species of conservation concern such as chestnut-sided warbler, brown-thrasher, eastern towhee, black and white warbler, blue-winged warbler, eastern red bat, and ruffed grouse (DeGraaf et al. 2006).

In a mature forest, many nesting bird species tend to remain within specific vegetation layers: on or near the ground, in the middle layer, or up in the canopy. Farmington River's hardwood forests should have all forest layers present in moderate to high amounts distributed throughout a stand and across the landscape. Enhanced vertical structure will provide the greatest number of bird species with the greatest number of nesting and foraging opportunities. Patches of very dense native shrub and understory layers (0-5 feet in height) are of particular importance to species like Canada warbler. These habitat elements may have importance to declining mature forest-interior species identified in regional conservation plans like wood thrush and blackburnian warbler. Wood thrush nest and feed at the ground level; a sub-canopy layer of shrubs, moist soils and leaf litter are important habitat features (Roth et al. 1996, Rosenberg et al. 2003) And wood thrush has significance as a NALCC representative species for hardwood forests in the NALCC southern sub-region. Improving vertical diversity by preserving softwood inclusions during forest management may provide an important habitat component for blackburnian warblers, who dwell in the upper canopies of conifers, and are thought to be strongly associated with the hemlock forests within Farmington River. Blackburnian warblers have been shown to decline in response to removal of hemlock by hemlock wooly adelgid (Tingley et al. 2002).

Our active forest management efforts will aim to create or maintain a canopy that is generally closed (greater than 75 to 80 percent closure) with small gap openings scattered throughout a stand and the CFA. These openings will be caused by or mimic small, single- to few-tree disturbances and create opportunities for regenerating intermediate- and shade-tolerant species. Regeneration in these openings will provide a continual supply of ephemeral nesting habitat for species like wood thrush. The distribution and concentration of these openings will vary, but interior forest conditions will be maintained on the whole. Close canopy conditions favor a suite of interior-nesting bird species that include: ovenbird, black-throated green warbler, and—along rocky bottomed streams—Louisiana waterthrush.

Efforts to maintain or improve seral stage diversity within the CFA will include the retention of large-diameter (24 inches of greater dbh) trees where appropriate. Such larger trees are either absent or are very few in younger forests, and that has implications for the habitat of wildlife species and for nutrient cycling. Structurally-sound, large-diameter trees are important nest sites for woodland raptors, such as the red-shouldered hawk. Emergent white pines—tall, large-diameter trees that extend above the canopy—provide special habitats that, when near the open bodies of water within the Farmington River CFA, are used by bald eagles. Standing trees that are dead and/or contain cavities will be present in all size classes for those species, like black bear, that use large logs or trees for their dens (Wynne and Sherburne 1984, Chapin et al. 1997, DeGraaf and Yamasaki 2001). Snags and cavity trees also provide important nesting and foraging sites for bird species such as nuthatches, owls, and woodpeckers, like the northern flicker.

Implementation of refuge strategies will begin with a comprehensive, multi-scale forest and wildlife habitat inventory. Forest wildlife species survival and breeding success is dependent not only on the habitat at the stand level, but also the surrounding landscape, making it necessary to consider the proportions and sizes of stand types and successional stages within the CFA and the associated landscape. Baseline information on the condition of hardwood forests at the time of acquisition will further inform more detailed, stand-level habitat prescriptions within a required step-down HMP.

Management Strategies:

Within 5 years of land acquisition and CCP approval:

- Identify forest stands with late successional characteristics for passive management, and those where active management is necessary to improve forest structure. Appendix J provides general forest management guidelines, including descriptions of forestry techniques and explanations about how we will determine where and how to conduct active management.
- Work with partners and adjacent landowners to identify areas appropriate for New England cottontail management. Plan to manage approximately, 375 acres of forest in early successional habitat for New England cottontail in the CFA. This approximation of the amount and distribution of acreage over the next 15 years assumes we would have a large enough land base to manage. Our target acreage may also be refined once site conditions are verified and a habitat management plan is completed.
- Work with partners, including the State, in support of the State Wildlife Action Plan, to ensure management on Service lands complement adjacent land management objectives.

Within 10 years of land acquisition and CCP approval:

- Implement identified active forest management opportunities using accepted silvicultural practices. Appendix J provides general forest management guidelines, including descriptions of forestry techniques and explanations about how we will determine where and how to conduct active management.
- Protect hard and soft mast producing species such as American beech inclusions, and apple and cherry trees, through the use of best management practices.
- Ensure a diversity of native species is present and non-native species are excluded or managed to keep population levels as low as possible.
- Explore research opportunities with academic partners to address efficacy of forest management in meeting wildlife objectives.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Conduct forest and wildlife inventories.
- Map natural communities; protect rare or exemplary examples.
- Map vernal pools and seeps.

Sub-objective 1.1b. (Hardwood Swamp)

Improve the diversity of seral stages, (where and when possible) restore historic composition and structure, and improve the natural hydrology to support natural and rare ecological communities. Management will provide breeding and foraging habitat for priority refuge resources of concern including Canada warbler.

Rationale:

Of the forest types within the Farmington River CFA, hardwood swamps have often undergone significant alteration and have great potential for restoration. This habitat type is often in basins, or on gently sloping seepage lowlands. Examples of this forest type may be found in small patches where an acidic substrate of mineral soil, often with a component of organic muck, creates a shallow, perched water table. Saturation can vary, with ponding of water common during wetter seasons and drought during the summer or autumn months. The dynamic nature of the watertable and the nutrient-poor soils drive complexes of forest upland and wetland species including eastern hemlock, red maple, and black gum. Within the Connecticut River watershed, including this CFA, agricultural practices and selective logging have largely removed this habitat from the landscape, or greatly simplified its historic species composition. Changes in hydrology, water pollution, invasive species introductions and soil compaction remain as threats

Successional trends in hardwood swamps are not well understood. One possibility is that these areas were once in softwoods such as hemlock, fir, cedar, or spruce. Heavy cutting and clearing for agriculture often eliminated

softwood species. Our conservation efforts within the Farmington River will focus on promoting the ecological integrity of these stands through restoration of degraded floodplains, and (where and when possible) restoring composition and structure to accepted historical conditions. Restoration of the primary natural disturbance mechanism (seasonal flooding) will aid in the restoration of historical species mixtures.

Many species of conservation concern use forested swamps, including northern parula, willow flycatcher, white-eyed vireo and rose-breasted grosbeak. Canada warbler, a priority refuge resource of concern, occupies this habitat type with high densities occurring in mixed forested swamps (Lambert and Faccio 2005, Reitsma et al. 2008, Chace et al. 2009). The wet soil conditions in swamps limit the canopy closure, and frequent blow downs create canopy gaps. This provides a well-developed shrub layer—an important habitat component for foraging and nest cover (Chace et al. 2009). Canada warbler shows area sensitivity in forests fragmented by suburban sprawl (Robbins et al. 1989). Hardwood swamps in the Farmington River CFA are within a matrix of contiguous forest, where fragmentation is not a concern. Hardwood swamp patches of ten acres or greater are thought to provide suitable breeding habitat for Canada warbler in the CFA, and allow monitoring of population response to management actions (Dettmers personal communication 2013).

Restoration of forest habitats, natural levees, backwater sloughs, and oxbow lakes will create high-quality habitat for neotropical migratory birds in an otherwise agricultural landscape where small, disturbed forest fragments are the rule. Closed canopy deciduous forests that include pin oak and other hardwoods provide mast and other foraging sites. Hardwood swamp stands with relatively large average stand diameters, a variety of tree conditions (including large-diameter dead stems, live trees with hollow stems and dead limbs, and small diameter suppressed and dying stems), and nearby water have a high habitat potential for cavity-dwelling wildlife species (DeGraaf et al. 2006).

Management Strategies:

Within 5 years of land acquisition and CCP approval:

- Work with partners, including the states of Massachusetts and Connecticut in support of the state wildlife action plans, to ensure management on Service lands complement adjacent land management.
- Evaluate hydrologic regime to inform restoration efforts.
- Identify forest stands where management is necessary to improve species composition. Appendix J provides general forest management guidelines, including descriptions of forestry techniques and explanations about how we will determine where and how to conduct active management.

Within 10 years of land acquisition and CCP approval:

- Implement identified forest management opportunities to improve species composition.
- Explore research opportunities with academic partners to address efficacy of forest management in meeting wildlife objectives.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Conduct forest and wildlife inventories.
- Map natural communities; protect rare or exemplary examples.
- Map vernal pools and seeps.

Sub-objective 1.1c. (Conifer Swamp)

Improve the diversity of seral stages, (where and when possible) restore historic composition and structure, and improve the natural hydrology to support natural and rare ecological communities. Management will provide breeding and foraging habitat for refuge resources of concern including Canada warbler.

Rationale:

Of the forest types within the Farmington River CFA, conifer swamps have often undergone significant alteration and have potential for restoration. This habitat type is often found in small patches on mineral soils that are nutrient poor; there may be an organic layer, but generally deep peat soils are

absent. These basin wetlands remain saturated for all or nearly all of the growing season, and may have standing water seasonally. There may be some seepage influence, especially near the periphery. The dynamic nature of the watertable drives complexes of forest upland and wetland species including red maple, balsam fir, red spruce, and ash species. Where soils tend more to alkaline conditions white cedar is a common tree species, and the shrub layer is generally more diverse. Within the Connecticut River watershed, and within the CFA, agricultural practices and selective logging have largely removed this habitat from the landscape, or greatly simplified its historic species composition. Changes in hydrology, water pollution, invasive species introductions and soil compaction remain as threats.

Successional trends in conifer swamps are not well understood. Heavy cutting and clearing for agriculture often eliminated softwood species. Our conservation efforts within Farmington River will focus on promoting the ecological integrity of these stands through restoration of degraded floodplains, and (where and when possible) restoring composition and structure to accepted historical conditions. Restoration of the primary natural disturbance mechanism (seasonal flooding) will aid in the restoration of historical species mixtures.

Where needed, restoration of softwood swamp habitats will create high-quality habitat for neotropical migratory birds. Closed canopy softwood forests that include white cedar and other softwoods provide important mast, food, nesting, and cover. Softwood swamp stands with large average stand diameters, a variety of tree conditions (including large-diameter dead stems, live trees with hollow stems and dead limbs, and small diameter suppressed and dying stems), and nearby water have a high habitat potential for cavity-dwelling wildlife species (DeGraaf et al. 2006).

Canada warbler, a priority refuge resource of concern, occupies this habitat type with high densities occurring in mixed forested swamps (Lambert and Faccio 2005, Reitsma et al. 2008, Chace et al. 2009). The wet soil conditions in swamps limit the canopy closure, and frequent blow downs create canopy gaps. This provides a well-developed shrub layer—an important habitat component for foraging and nest cover (Chace et al. 2009). Canada warbler shows area sensitivity in forests fragmented by suburban sprawl (Robbins et al. 1989). Conifer swamps in the Farmington River CFA are within a matrix of contiguous forest, where fragmentation is not a concern. Conifer swamp patches of ten acres or greater are thought to provide suitable breeding habitat for Canada warbler in the CFA, and allow monitoring of population response to management actions (R. Dettmers personal communication 2013).

Implementation of refuge strategies will begin with a comprehensive, multi-scale forest and wildlife habitat inventory. Forest wildlife species survival and breeding success is dependent not only on the habitat at the stand level, but also the surrounding landscape, making it necessary to consider the proportions and sizes of stand types and successional stages within the CFA and the associated landscape. Baseline information on the condition of hardwood swamps at the time of acquisition will further inform more detailed, stand-level habitat prescriptions within a required step-down HMP.

Management Strategies:

Within 5 years of land acquisition and CCP approval:

- Evaluate hydrologic regime to inform restoration efforts.
- Identify forest stands where management is necessary to improve species composition. Appendix J provides general forest management guidelines, including descriptions of forestry techniques and explanations about how we will determine where and how to conduct active management.
- Work with partners, including the states of Massachusetts and Connecticut in support of the state wildlife action plans, to ensure management on Service lands complement adjacent land management.

Within 10 years of land acquisition and CCP approval:

- Implement identified forest management opportunities to improve species composition. Appendix J provides general forest management guidelines, including descriptions of forestry techniques and explanations about how we will determine where and how to conduct active management.
- Explore research opportunities with academic partners to address efficacy of forest management in meeting wildlife objectives.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Conduct forest and wildlife inventories.
- Map natural communities; protect rare or exemplary examples.
- Map vernal pools and seeps.

Sub-objective 1.1d. (Shrub Swamps and Floodplain Forests)

Manage shrub swamp and floodplain forest communities to support natural and rare ecological communities, and provide habitat for priority refuge resources of concern including American black duck and New England cottontail.

Rationale:

Shrub swamps are restricted to poorly drained areas, small seepage zones, and wide alluvial stretches of rivers and small streams. Shrubs tend to dominate the wetland, though grasses may be present. Typical species include willow, silky dogwood, speckled alder, white meadowsweet, bluejoint, tall sedge, and common rush (Gawler 2008). These wetlands are also created through beaver activity, a natural and important disturbance process within the CFA. Our coarse-scale habitat analysis of this CFA identifies a shrub swamp wetland complex in the northwestern portion of the CFA. The landscape mosaic of dense shrubs, grassy openings, flooded areas and ponds in various stages of succession provide a diversity of plant communities, and habitats for a variety of wildlife species, including New England cottontail and American black duck, priority resources of concern.

New England cottontail is a candidate species for listing under the Endangered Species Act, and is a species of greatest conservation need in Connecticut and Massachusetts. The historic range of this species likely included southeastern New York, north through the Champlain Valley and into southern Vermont, New Hampshire and Maine, and statewide in Massachusetts, Connecticut and Rhode Island. Due to loss of early successional habitat to development and forest maturation, this species occupies less than a fifth of its historical range (Fuller and Tur 2012). New England cottontail is no longer sustaining a viable population, and given this conservation urgency, a range-wide New England cottontail Initiative was established. This initiative involves collaboration from multiple agencies, including the USFWS, state wildlife agencies, universities, Natural Resources Conservation Service, The Nature Conservancy, and Wildlife Management Institute, to address cottontail conservation on a landscape scale.

Focus areas were identified as locations to manage and restore habitat for New England cottontail. The Farmington River CFA was one of forty-nine focus areas in six states. Early successional management and protection of adjacent natural shrubland habitat, such as shrub swamps, will meet the conservation goals set for the New England cottontail. "A Conservation Strategy for the New England cottontail" was developed and approved in November 2012, and provides the conservation and habitat management goals and strategies for this species (Fuller and Tur 2012).

American black ducks also use shrub swamp communities, though black ducks prefer shrub swamps that are flooded or adjacent to open water habitats. Black ducks rely on these wetlands during the breeding season, and as stopover habitat during migration. Adults and their broods forage on seeds, aquatic vegetation and invertebrates in flooded shrub swamp communities, or adjacent open water habitats. Adults place well-concealed nests in uplands or dry hummocks near wetland foraging habitat (Longcore et al. 2000, DeGraaf and Yamasaki 2001). American black duck is a species of concern in the North American Waterfowl Management Plan because of historic population declines, and is listed as highest priority for conservation in BCR 30. An evaluation of the wetlands in the CFA will be necessary to determine their potential as habitat for American black duck.

Implementation of refuge strategies will begin with a comprehensive, multi-scale wildlife habitat inventory. Wildlife species survival and breeding success is dependent not only on the habitat at a fine scale, but also the surrounding landscape, making it necessary to look at the adjacent habitat conditions and land uses within the CFA and associated landscape. Baseline information on the condition of shrub swamps at the time of acquisition will further inform more detailed habitat prescriptions within a required step-down HMP.

Management Strategies:

Within 5 years of land acquisition and CCP approval:

- Minimize refuge activities that disturb wetland communities.
- Incorporate shrub swamps, where appropriate, into the network of habitat patches required for New England cottontail.
- Work with partners, including the state in support of their state wildlife action plans, to ensure management on Service lands complement adjacent land management objectives.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Survey wildlife use of wetlands.
- Map natural communities; protect rare or exemplary examples.

Sub-objective 1.1e. (Biological Integrity, Biological Diversity, and Environmental Health)

Where a focal species has not been identified, protect and restore habitats that contribute to the biological integrity, diversity, and environmental health of refuge lands and the Connecticut River watershed.

Rationale:

Achieving the refuge purposes and the Refuge System mission are the paramount considerations for refuge management. Additionally, the Service has policy for maintaining and restoring, where appropriate, refuges' "biological integrity, diversity, and environmental health" (601 FW 3). This policy provides refuge managers with a process to analyze their refuge and recommend the best management direction to prevent further degradation of environmental conditions; and where appropriate, restore lost or severely degraded components. The policy suggests using historic conditions as a reference for comparing the ecosystem's current composition, structure, and functioning to what it was prior to substantial human related changes to the landscape. This comparison can be used to direct management to maintain or restore those natural conditions, to the extent practicable, without jeopardizing refuge purposes. For example, we consider the natural timing and frequency of disturbances, such as fires and flooding, and mimic those processes. In other words, the policy is intended to induce management for native fish, wildlife, and plants and their habitats in natural conditions, and with natural processes, using historic conditions to help identify such conditions and processes (Paveglio et al. 2010). However, we recognize that it is not always possible or desirable to try to mimic historic conditions, particularly in the face of predicted climate and land use changes and other landscape-scale considerations. Historic conditions are only one of many considerations when making decisions about how to manage refuge resources.

Conservationists often use the metaphor of coarse filters and fine filters to convey two complementary strategies for maintaining biological diversity, biological integrity, and environmental health: the first focuses on conserving ecosystems and the second focuses on species (Noss 1987, Hunter 1991, Groves 2003). The coarse-filter approach seeks to protect a representative array of natural ecosystems and their constituent processes, structures, and species (the refuge); however, some species fall through its pores, and coarse filters must be complemented by fine filter strategies tailored to fit particular species (priority species of concern). Sub-objectives throughout this plan generally represent a fine-filter approach—identifying species and their habitats that the USFWS has identified as priorities based upon our establishing legislation, refuge system mission, regional and national conservation plans, and conversations with conservation partners. In contrast, this sub-objective outlines CFA management that will benefit many of its species, the majority of which will not receive the special, tailored attention of fine-filter conservation. The BIDEH policy guidance complements coarse-filter conservation in ways that fine-filter conservation misses.

The key idea of BIDEH conservation is that most ecosystems contain certain features that are critical to the welfare of many species; thus, conserving those features can have a positive effect on a large suite of species (biological diversity). Logs in a forest, hedgerows in an agricultural landscape, and streams and pools in many terrestrial ecosystems are all examples of ecosystem features that support far more species than one would predict based on their size alone. The importance of conserving these features is widely recognized, but in an ad hoc, idiosyncratic fashion that often does not recognize the commonality between maintaining a hedgerow, a rock outcrop, and an herbaceous wetland. BIDEH conservation overlaps with many aspects of matrix management

and ecosystem management (Lindenmayer and Franklin 2002). A key difference is its specific focus on ecosystem elements, which explicitly complements coarse-filter and fine-filter conservation.

Habitats that occur within the Farmington River CFA where species-specific management guidelines are not identified will be managed under the umbrella BIDEH policy. These habitats are most often small or isolated occurrences, but are important in maintaining connectivity within the larger forested matrix, and providing additional structural and species diversity to the matrix. Rocky outcrops and upland meadows, for instance, are anomalies in an otherwise forested landscape. They often have a distinctive flora and fauna—providing sunny, dry sites for reptiles to bask, or nectar producing flowers for foraging butterflies. One could make the case that these outcrops are small, independent ecosystems, but they are really too small to be candidates for a classic coarse-filter strategy and thus best considered in a BIDEH context. This approach will allow the conservation of large numbers of species, the majority of which are too poorly known to be conserved individually (e.g., imagine species conservation plans for particular insects or liverworts). Together, the multiple strategies are reasonably comprehensive because all species and habitats known to be in jeopardy will receive needed attention.

The negative consequences of habitat loss and fragmentation to aspects of biological integrity, diversity and health have been shown by a large number of theoretical and empirical studies, in different environments, and for a large array of taxa (Fahrig 2003). Our understanding of the current condition of all the habitats considered under this sub-objective and their contribution to the BIDEH of the CFA is limited. A comprehensive forest and wildlife habitat inventory will be necessary to inform more detailed management strategies that provide the full range of natural processes.

Management Strategies:

Within 5 years of CCP approval:

- Work with partners, including the states of Massachusetts and Connecticut in support of their state wildlife action plans, to ensure management on Service lands complement adjacent land management objectives.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Conduct habitat and wildlife inventories.
- Map natural communities; protect rare or exemplary examples.

Objective 1.2: Non-forested Uplands and Wetlands

Sub-objective 1.2a. (Freshwater Marsh)

Manage freshwater marshes to support natural and rare ecological communities, and provide potential breeding and foraging habitat for priority refuge resources of concern including American black duck.

Rationale:

Freshwater marshes are often dominated by emergent and submerged herbaceous vegetation. Scattered shrubs are often present, and trees are generally absent. Herbaceous vegetation typically includes common bulrush, jewelweed, marsh fern, water lily and narrow-leaved cattail (Gawler 2008). Our coarse-scale habitat analysis of this CFA identifies freshwater marsh habitat along Thorp Brook and around the perimeter of an unnamed pond off Roberts Road.

These wetlands are adjacent to a slow moving stream, and open water, providing foraging, and potentially breeding habitat for American black duck, and other waterfowl species. Black ducks place well-concealed nests on the ground in adjacent uplands or hummocks within wetlands, and adults and their broods feed on seeds and herbaceous vegetation, as well as invertebrates (Longcore et al. 2000, DeGraaf and Yamasaki 2001). An evaluation of the wetlands in the CFA will be necessary to determine their potential as habitat for American black duck.

Implementation of refuge strategies will begin with a comprehensive, multi-scale wildlife habitat inventory. Wildlife species survival and breeding success is dependent not only on the habitat at a fine scale, but also the surrounding landscape, making it necessary to look at the adjacent habitat conditions and land uses within the CFA and associated landscape. Baseline information on the condition of freshwater marshes at the time of acquisition will further inform more detailed habitat prescriptions within a required step-down HMP.

Management Strategies:

Within 5 years of land acquisition and CCP approval:

- Evaluate wetland hydrology for impacts to natural flow regimes.
- Work with partners, including the states in support of their state wildlife action plans, to ensure management on Service lands complement adjacent land management objectives.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Inventory wetland plant communities.
- Survey wildlife use of wetlands.
- Map natural communities; protect rare or exemplary examples.

Sub-objective 1.2b. (Pasture/Hay/Grassland)

Provide appropriate conditions within current pasture, hay, and grassland acreage that will support New England cottontail (where appropriate) and other shrub-dependent conservation concern species such as chestnut-sided warbler. Also maintain large contiguous tracts of grassland habitat, if present and appropriate.

Rationale:

Over one percent of the Farmington River is typed as pasture, hay and grassland habitat. These habitat types require active manipulation to inhibit the natural succession of converting to forest. The pasture, hay, and grassland habitats tend to be dominated by grasses. Depending on habitat patch size, continuity of patches and timing of manipulations, this habitat type will support many grassland dependent species such as bobolink and grasshopper sparrow. If these habitats are left unmaintained (e.g. not mowed), they will convert to a mixture of shrubs and grasses providing “old field” habitat for shrub dependent species such as chestnut-sided warbler, prairie warbler, field sparrow, American woodcock, blue-winged warbler, and New England cottontail, a species petitioned for Federal listing.

Many shrubland bird breeding populations occur in high proportions in the northeast, and therefore, are species of conservation responsibility (Dettmers, Randy 2003). While there is evidence that southern New England supported a small but significant grassland bird community before European settlement, only a small proportion of grassland breeding bird populations occur in the northeast (Dettmers and Rosenberg 2000). Maintaining high quality shrubland habitat in this CFA will provide habitat for a higher percentage of species in decline. However, large and contiguous grasslands are rare in the watershed, and large grassland habitat patches are important to high priority grassland species and overall biological diversity. We will maintain large grassland patches (e.g. 500 acres), or areas where a high proportion of grassland cover is present in the landscape (e.g., a mosaic of many medium to large patches).

Another species of conservation concern that uses shrubland dominated habitat is New England cottontail. This species is New England cottontail is petitioned for listing under the ESA, and is a species of greatest conservation need in Connecticut and Massachusetts. The Farmington River CFA is a New England cottontail Focus Area, which are areas identified as locations to manage and restore habitat for New England cottontail. New England cottontail require early successional habitat (dense shrubs and tree saplings), and the pastures, hay fields, and grasslands in the CFA will provide this habitat with very little initial manipulation.

The conceptual model for the conservation of New England cottontail is for a focus area to contain at least 1,000 acres of early successional habitat of fifteen or more habitat patches, several of which are 25 acres or more. Each habitat patch should be one mile or less from each other to aid in New England cottontail movement between patches (Fuller and Tur 2012). Where appropriate, pastures, hay fields, and grasslands will be incorporated into the network of patches managed for New England cottontail by allowing woody stem colonization.

Shrubland dominated habitats in the northeast support many species of conservation concern, many of which are a high conservation responsibility for the region, indicating the importance of shrubland habitats to these species in the CFA. Large, contiguous grassland habitats are also important to a suite of priority grassland bird species. Current pasture, hay, and grassland acres can provide quality habitat

if managed appropriately. Baseline information on the condition of these habitats and association with other landscape features will further inform more detailed habitat prescriptions within a required step-down HMP.

Management Strategies:

Within 5 years of land acquisition and CCP approval:

- Work with partners to protect and promote farming practices (e.g. haying and pasture of animals) that benefit wildlife and protect water quality.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Conduct an inventory of these habitats to determine their condition, size and location, which will inform and prioritize appropriate management strategies in the HMP.

Sub-objective 1.2c. (Biological Integrity, Biological Diversity, and Environmental Health)

Where a focal species has not been identified, protect and restore habitats that contribute to the biological integrity, diversity, and environmental health of refuge lands and the Connecticut River watershed.

Rationale:

See the rationale for sub-objective 1.1e.

Habitats that occur within the Farmington River CFA where species-specific management guidelines are not identified will be managed under the umbrella BIDEH policy. These habitats are most often small or isolated occurrences, but are important in maintaining connectivity within the larger forested matrix, and providing additional structural and species diversity to the matrix. Rocky outcrops and upland meadows, for instance, are anomalies in an otherwise forested landscape. They often have a special flora and fauna—providing sunny, dry sites for reptiles to bask, or nectar producing flowers for foraging butterflies. One could make the case that these outcrops are small, independent ecosystems, but they are really too small to be candidates for a classic coarse-filter strategy and thus best considered in a BIDEH context. This approach will allow the conservation of large numbers of species, the majority of which are too poorly known to be conserved individually (e.g., imagine species conservation plans for particular insects or liverworts). Together, the multiple strategies are reasonably comprehensive because all species and habitats known to be in jeopardy will receive needed attention.

The negative consequences of habitat loss and fragmentation to aspects of biological integrity, diversity and health have been shown by a large number of theoretical and empirical studies, in different environments, and for a large array of taxa (Fahrig 2003). Our understanding of the current condition of all the habitats considered under this sub-objective and their contribution to the BIDEH of the CFA is poor. A comprehensive forest and wildlife habitat inventory will be necessary to inform more detailed management strategies that provide the full range of natural processes.

Management Strategies:

Within 5 years of CCP approval:

- Work with partners, including the states of Massachusetts and Connecticut, in support of the state wildlife action plans, to ensure management on Service lands complement adjacent land management objectives.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Conduct habitat and wildlife inventories.
- Map natural communities; protect rare or exemplary examples.

Objective 1.3: Inland Aquatic Habitats

Sub-objective 1.3a. (Open Water)

In collaboration with partners, manage water resources and riparian areas to provide cold temperature regimes, substrate diversity, and clear aquatic species passage that benefit priority refuge resources of concern including Eastern brook trout and American eel, as well as other species of conservation concern such as sea lamprey.

Rationale:

The Farmington River supports the highest diversity of mussels in the Connecticut River watershed, though the majority of these occurrences are in the lower reaches. The West Branch of the Farmington River occurs along the eastern boundary of the Farmington River CFA. This branch has been dammed by the Army Corps of Engineers for flood control, and the Colebrook Lake Reservoir and West Branch Reservoir were created. These reservoirs are stocked with trout to complement the occurrence of bass, pickerel, perch, brown bullhead, and bluegill. The CTDEEP also stocks Atlantic salmon fry into Sandy Brook, which is within the CFA, as part of its Atlantic Salmon Legacy Program. Future restoration of other diadromous species, such as sea lamprey is being proposed by CTDEEP once aquatic species passage is provided at the Collinsville dams.

American eel, a species petitioned for listing under the Endangered Species Act, is present in the West Branch, and many of the small streams and brooks support Eastern brook trout. American eel enter the Connecticut River as juveniles, and migrate upstream to inhabit bays, estuaries, streams, lakes, and ponds. Eels feed in these aquatic habitats until they reach sexual maturity and begin the long migration to their spawning grounds in the Sargasso Sea (ASMFC 2000). Brook trout are sensitive to extreme temperature fluctuations, and require water temperatures between 40-70 degrees Fahrenheit for spawning, growth, and survival. Forested buffers along stream edges, a structurally diverse instream habitat, with boulders and downed woody debris providing riffles and pools, and clear aquatic species passage to spawning and wintering habitat is important to maintain habitat requirements for brook trout, and other aquatic species.

A comprehensive, multi-scale habitat and wildlife inventory will be necessary to understand aquatic and surrounding habitat conditions in the CFA. We will work with partners to analyze current available data, and conduct additional assessments, as needed, to inform more detailed management and monitoring strategies within a required step-down HMP.

Management Strategies:

Within 5 years of land acquisition and CCP approval:

- Collaborate with partners in the Farmington River Coordinating Committee to strategically prevent and manage invasive species within the 14-mile stretch of the Upper Farmington River that is designated as Wild and Scenic River and abutting lands.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Work with partners to conduct stream assessments to evaluate stream and fish community health.
- Map natural communities; protect rare or exemplary examples.

Objective 1.4: Coastal Non-forested Uplands (coastal beaches and rocky shores)

Not applicable

Objective 1.5: Coastal Wetlands and Aquatic Habitats (tidal salt marsh and estuary)

Not applicable

Goal 2: Education, Interpretation, and Outreach: Inspire residents and visitors to actively participate in the conservation and stewardship of the exceptional natural and cultural resources in the Connecticut River watershed, and promote a greater understanding and appreciation of the role of the Silvio O. Conte National Fish and Wildlife Refuge in conserving those resources.

Objective 2.1: Environmental Education

In collaboration with public and private educators from all four states in the watershed, lead or facilitate the implementation of structured natural and cultural resource curricula, with a focus on guiding educators and students to develop an awareness of, and concern about, natural and cultural resources and associated challenges; appreciate our conservation history; make informed decisions and work individually or collectively toward solutions; and model responsible environmental stewardship in their everyday lives.

Sub-objective 2.1a. (Environmental Education Planning and Training)

Encourage schools, scout groups, summer camps, and other youth educational organizations to develop curricula that use the Farmington River Division as an outdoor classroom.

Rationale:

See environmental education rationale in chapter 4 detailing the importance of environmental education for the Service. Environmental education is one of the six priority, wildlife-dependent recreational uses of the Refuge System. Environmental education is particularly important at Conte Refuge because one of its founding purposes is to provide opportunities for environmental education. Environmental education is an important tool that can help refuge visitors and local residents, particularly students, appreciate the importance of this area to the larger watershed.

Management Strategies:

Within 1 year of acquiring sufficient land:

- Encourage schools, scout groups, and summer camps to develop curricula that use the Farmington River Division as an outdoor classroom.

Sub-objective 2.1b. (Environmental Education Delivery)

Encourage schools, scout groups, and summer camps to use the Farmington River Division as an outdoor classroom.

Rationale:

Because this division will be unstaffed, the majority of environmental education opportunities on this division will be led by partners, volunteers, and local school groups and other educational groups (e.g., scout groups and summer camps).

Management Strategies:

Within 1 year of acquiring sufficient land:

- Encourage schools, scout groups, and summer camps to develop curricula that use the Farmington River Division as an outdoor classroom.

Objective 2.2: Interpretation

Develop, lead, and facilitate interpretive programs that emotionally and intellectually connect the audience to natural and cultural resources in the watershed.

Sub-objective 2.2a. (Natural and Cultural Resource Interpretive Planning and Training)

With Friends groups, public and non-profit organizations, and volunteers, offer quality interpretive programming at the Farmington River Division. The development of highly trained interpreters will be encouraged by offering interpretive training to Friends' members, partners, and volunteers on a regular basis.

Rationale:

See the rationale in chapter 4 detailing the importance of interpretation for the Service. Interpretation is an important tool that can help refuge visitors and local residents appreciate the importance of this area to the larger watershed. With an ADA-compliant trail planned for the site, the Farmington River Division will be well suited to support both self-guided, wildlife dependent interpretive experiences, as well as guided interpretive programs that convey messages about the refuge and about the Farmington River Division's habitats and cultural resources.

Management Strategies:

Within 5 years of acquiring sufficient land and CCP approval:

- Inventory and evaluate each CFA to determine the appropriate interpretive materials to employ.
- Create meaningful, consistent, thematic statements to be used in the delivery of programming at the Farmington River Division.
- Provide resources and trainings to Friends, and volunteers in support of interpretive programs.

Within 10 years of acquiring sufficient land and CCP approval:

- Develop standardized self-guided interpretive services, such as interpretive trails and kiosks, exhibits, and printed media.
- Employ a variety of themed interpretive offerings (e.g., presentations, audio-visual programs, brochures, and exhibits) when creating programming for natural and cultural resource interpretation.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Build an evaluation process that includes formal and informal evaluation to assess the effectiveness of all interpretation programs.

Sub-objective 2.2b. (Natural and Cultural Resource Interpretive Program Delivery)

Collaborate with Friends group, partners, and volunteers to deliver quality natural and cultural resource interpretive programs.

Rationale:

See rationale for sub-objective 2.2a.

Management Strategies:

(These strategies are dependent on land acquisition from willing landowners.)

Within 5 years of acquiring sufficient land and CCP approval:

- Through partners, and Friends group, annually provide quality interpretive programs, exhibits, printed media at the Farmington River Division.
- Incorporate thematic statements, measureable objectives and evaluation measures into all interpretation efforts.
- Publicize interpretive programs through traditional media, on the refuge web site, and digital social media conduits.
- Maintain a supply of print interpretive brochures (e.g., general brochure and bird checklist) that incorporate refuge interpretive messages and themes.
- Work with partners to create issue-oriented experiential activities and programs for use at their facilities.

Within 10 years of acquiring sufficient land and CCP approval:

- Contribute refuge interpretive information for scenic byways and other state publications and signs.
- Develop self-guided interpretive messages and use state of the art as well as traditional media (e.g., brochures).

Objective 2.3: Public and Community Outreach

Support, promote, and coordinate a wide range of outreach tools and activities to facilitate and improve communications and relationships with the American public, especially communities, adjacent landowners, and elected officials in the Connecticut River watershed, and to empower citizens to recognize and resolve local natural resource issues and promote conservation and the responsible use of natural resources.

Because the Farmington River Division would be unstaffed and does not have refuge facilities, public and community outreach for this site will occur through regular outreach activities at the headquarters and will not specifically occur at this site.

Objective 2.4: Science and Technical Outreach

Facilitate the collection and exchange of information that increases the knowledge and understanding of natural and cultural resources, addresses climate change and other conservation issues, and provides land managers with better information to make management decisions affecting resources.

Because the Farmington River Division would be unstaffed and does not have refuge facilities, science and technical outreach for this site will occur through regular outreach activities at the headquarters and will not specifically occur at this site.

Goal 3: Recreation: Promote high-quality public recreational opportunities in the Connecticut River watershed that are complementary between ownerships and provide regional linkages with emphasis on promoting wildlife-dependent activities that connect people with nature.

Objective 3.1: Hunting

Support quality public hunting opportunities in the Connecticut River watershed to promote a unique understanding and appreciation of natural resources and their management on lands and waters, while also protecting a traditional outdoor pastime deeply rooted in America's natural heritage and conservation history.

Sub-objective 3.1a. (Hunting Opportunity, Access, and Infrastructure)

Provide the opportunity for a quality hunting experience based on state regulations.

Rationale:

The Farmington River CFA is a popular area to hunt white-tailed deer, Eastern wild turkey, black bear (Massachusetts), and small game. Existing public hunting areas include Sandisfield State Forest in Massachusetts, Algonquin and Tunxis State Forests in Connecticut. Hunting would be allowed on a newly created division, consistent with the final compatibility determination. Retaining hunting opportunities on public lands will ensure this wildlife-dependent recreational activity continues and contribute to the state's population management objectives.

Management Strategies:

Within 1 year of acquiring sufficient land to support hunting seasons:

- Complete all administrative requirements to officially open to hunting consistent with State hunting regulations and, if necessary, additional refuge-specific regulations.
- Allow hunters access to the refuge outside of the normal division open hours (i.e. 30 minutes before sunrise and 30 minutes after sunset) as long as they are engaged in lawful hunting activities.
- Consult with Connecticut Department of Energy and Environmental Protection, Hunting Review Team in evaluating the suitability of new acquisitions in Connecticut to support a safe, manageable hunt program.
- Post newly acquired properties to ensure refuge boundary lines are clearly marked.

- Install an informational kiosk in a conspicuous location to post information on hunting seasons and other notices to visitors.
- Allow temporary tree stands and blinds that meet state hunting regulations and do not harm trees or other refuge vegetation. Tree stands and blinds must have the owner's name and phone number clearly displayed, and they must be removed at the end of the hunt season.

Within 5 years of acquiring sufficient land to support hunting seasons:

- Work with Massachusetts Department of Fish and Game and Connecticut Department of Energy and Environmental Protection to determine whether opportunities exist for state-recognized disabled hunters.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Work with Massachusetts Department of Fish and Game and Connecticut Department of Energy and Environmental Protection to evaluate the effectiveness and success of the refuge hunt program in contributing to state population objectives.

Sub-objective 3.1b. (Hunter Education and Outreach)

Provide hunter education classes access to the division and conduct directed outreach to ensure hunters are informed about regulations, hunter ethics, and safety considerations. Develop programs, including brochures, signage, website pages, media releases, etc. to increase interest in hunting at the division.

Rationale:

Hunting is a priority public use that also serves as a population management tool. Providing hunter education instructors the opportunity to use the division with their classes will strengthen connections to the hunting community and student understanding of the role hunting plays in wildlife management. Making relevant information readily available to hunters through a variety of media will improve the quality of the hunting experience.

Management Strategies:

Within 1 year of acquiring sufficient land to support hunting seasons:

- Produce a hunt brochure that includes a hunt map and information on regulations, hunter ethics, safety considerations, etc. and make it available on the refuge Web site, at Farmington River Division kiosks, through a friends group, and in local businesses.
- Provide visitors with general information on the hunting program and refuge-specific and State regulations through the refuge website, information signs, and a hunting brochure. In all materials related to the hunting program, promote and encourage the use of lead-free ammunition.
- Work with the State to identify and evaluate the impacts associated with requiring the use of non-toxic ammunition for hunting on refuge lands.

Within 5 years of acquiring sufficient land to support hunting seasons:

- Work with Massachusetts Department of Fish and Game and Connecticut Department of Energy and Environmental Protection to encourage youth hunting at the division as a means of introducing young people to this traditional recreation activity.
- Offer to host hunter education field courses.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Develop a system to monitor and evaluate the hunting program with hunters and other users to determine if the objective is being met and to allow for adaptive management.

Objective 3.2: Fishing

Support quality, public fishing opportunities in the Connecticut River watershed to promote an understanding and appreciation of natural resources and their management on lands and waters, while also protecting a traditional outdoor pastime deeply rooted in the America's natural heritage and conservation history.

Sub-objective 3.2a. (Fishing Opportunities, Access and Infrastructure)

Provide quality fishing opportunities at the Farmington River Division after completing all administrative procedures to officially open refuge lands to fishing, based on Massachusetts Department of Fish and Game and Connecticut Department of Energy and Environmental Protection regulations, and Division-specific conditions, if necessary.

Rationale:

There are several rivers in the proposed CFA including the West Branch of the Farmington River and Sandy Brook. Both rivers support a cold water fishery that includes Eastern brook trout. A variety of other game fish are found in streams and ponds within the CFA. Fishing is a popular activity throughout this area and would continue under Service ownership, consistent with the final compatibility determination. Retaining fishing opportunities conforms to historic use on CFA and much of the surrounding land in the area.

Management Strategies:

(These strategies are dependent on land acquisition from willing landowners and determination that fishing is a compatible use.)

Within 1 year of acquiring land with fishable waters:

- Complete all administrative requirements to officially open to fishing consistent with State hunting regulations and, if necessary, additional refuge-specific regulations.
- Post newly acquired properties to ensure refuge boundary lines are clearly marked.
- Install an informational kiosk to post information on fishing seasons and other notices to visitors.
- The Farmington River Division would be open to visitors actively engaged in fishing during the seasons and times established by the respective states in their annual fishing regulations.

Within 5 years of acquiring land:

- Produce a brochure that highlights fishing opportunities for distribution at a division kiosk and the refuge web site.
- Work with the Massachusetts Department of Fish and Game and Connecticut Department of Energy and Environmental Protection to inventory and assess fish populations on the division.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Develop a system to monitor and evaluate the fishing program with anglers and other users to determine the objective is being met and to allow for adaptive management.

Sub-objective 3.2b. (Angler Education and Outreach)

Develop programs, including brochures, signage, website pages, media releases, etc. to inform visitors of fishing opportunities at the division.

Rationale:

Fishing is a priority public use and a traditional use in the CFA. If land is acquired, the refuge will make information readily available to interested anglers regarding opportunities to fish on Service-owned land, location of fishable waters, and the available game fish.

Management Strategies:

(These strategies are dependent on land acquisition from willing landowners and determination that fishing is a compatible use.)

Within 1 year of acquiring land with fishable waters:

- Produce a fishing brochure that includes information on regulations, angler ethics, safety considerations, etc. and make it available on the refuge website, at informational kiosks, and in local businesses. In all materials related to the fishing program, promote use of lead-free tackle.

Objective 3.3: Wildlife Observation and Photography

Support quality, public opportunities to observe and photograph wildlife in the Connecticut River watershed in a variety of natural habitats to connect a broad spectrum of people with nature.

Sub-objective 3.3a. (Infrastructure and Access for Wildlife Observation and Photography)

Provide quality opportunities for wildlife observation and photography at the division.

Rationale:

Wildlife viewing and photography are priority public uses on national wildlife refuges and a popular recreational activity. A new division in this area would offer people the chance to see and photograph wildlife and in their native habitats, while learning more about the Service, Refuge System, and the refuge.

Management Strategies:

(These strategies are dependent on land acquisition from willing landowners and determination that wildlife observation and photography are compatible uses.)

Within 1 year of acquiring land:

- Consistent with the final compatibility determination, allow public access from 30 minutes before sunrise to 30 minutes after sunset with the exceptions listed for hunters and anglers. The refuge manager may issue a special use permit for public uses during the closed hours.
- Install an informational kiosk to post information on wildlife observation and photography opportunities, and other notices to visitors.

Within 5 years of acquiring land:

- Develop a public access strategy and required planning (i.e. NEPA, compatibility determination) that includes consideration of developed trails, parking, kiosks, viewing platforms, blinds, interpretation, signage, etc.

Within 15 years of acquiring land:

- Implement the visitor use enhancements identified in the public access strategy and the refuge Visitor Services Plan.

Sub-objective 3.3b. (Wildlife Observation and Photography Aids)

Offer viewing and photography aids that enhance the visitor experience. Use a variety of methods to reach a broad spectrum of people. Work closely with a friends group and other partners.

Rationale:

The entire division would be available for wildlife observation and photography; however, there are steps the refuge can take to enhance the experience. By providing new visitors a quality experience they are more likely to return and share their experiences with others. One way to accomplish this is to offer sufficient information to attract a variety of visitors through a variety of media.

Management Strategies:

(These strategies are dependent on land acquisition from willing landowners and determination that wildlife observation and photography are compatible uses.)

Within 1 year of acquiring land:

- Allow photography blinds that do not negatively impact wildlife behavior or conflict with other visitors. Blinds must be removed each day, unless arrangements have been made via a special use permit.

Within 5 years of acquiring land:

- Develop interpretive panels describing typical wildlife on the refuge, bird migration patterns, and other messages we want to convey to visitors.
- Sponsor wildlife observation events such as International Migratory Bird Day, the Big Sit, etc.
- Encourage local schools, groups, and environmental organizations to include wildlife-centered trips to the refuge.

- Produce a list of wildlife species and associated habitats and other conservation information on the division for distribution at informational kiosks, the refuge website, and other popular media.

Within 10 years of acquiring land:

- Develop a public access strategy and required planning (i.e. NEPA, compatibility determination) that includes consideration of developed trails, parking, kiosks, viewing platforms, blinds, interpretation, signage, etc.

Sub-objective 3.3c. (Watershed-based Partner Initiatives)

Develop compatible opportunities in the Farmington River CFA that promote state and watershed-wide initiatives that facilitate wildlife observation and photography and which raise the visibility of the Service and the Refuge System, make the refuge more relevant to the local community, and promote economic activity in the local area.

Rationale:

There are many partners active in the Farmington River watershed, including the Farmington River Watershed Committee. We would work with partners to help achieve shared conservation and recreation goals.

Management Strategies:

Within 5 years of acquiring land:

- Work with local and regional organizations that have developed conservation and recreation plans to implement these plans to the extent that they are compatible and consistent with refuge management.

Objective 3.4: Other Recreational Activities

In order to reach a broader demographic, support non-priority outdoor recreational opportunities and public access to quality, nature-based experiences throughout the Connecticut River watershed that facilitate and improve community relationships, raise awareness and an appreciation for conserving natural resources, and garner support for the National Wildlife Refuge System.

Sub-objective 3.4a. (Regional Water-based Trail Initiatives and Opportunities Including Refuge Lands)

Develop compatible opportunities on the Farmington River Division that support regional water-based trail initiatives to connect people with nature, raise the visibility of the Service and the Refuge System, make the refuge more relevant to the local community, and to promote economic activity in the local area.

Rationale:

Regional water-based trails give individuals opportunities to engage in outdoor recreational opportunities in the Connecticut River watershed, such as fishing, boating, and wildlife observation. Examples include the Connecticut River waterway route. Where appropriate, we will work with these partners to promote, and distribute information about, these opportunities.

Management Strategies:

Within 5 years of acquiring land:

- Work with public and private partners to determine whether and what roles this division might contribute to a Connecticut River waterway route.
- As lands are acquired, evaluate any water trails (e.g., canoe/kayak trails) that part of a regional or State network for their compatibility.

Sub-objective 3.4b. (Regional Land-based Trail Initiatives and Opportunities Including Refuge Lands)

Develop compatible opportunities on the Farmington River Division that support regional land-based trail initiatives to connect people with nature, raise the visibility of the Service and the Refuge System, make the refuge more relevant to the local community, and to promote economic activity in the local area.

Rationale:

Regional land-based trails give individuals opportunities to engage in outdoor recreational opportunities in the Connecticut River watershed, such as hiking, wildlife observation, and interpretation. Where appropriate, we will work with these partners to promote, and distribute information about, these opportunities.

Management Strategies:

Within 5 years of acquiring land:

- As lands are acquired, evaluate any existing trails (e.g., hiking trails, snowmobile trails, horseback riding trails) that part of an established regional or State network to determine if they are appropriate and compatible uses for the refuge.

Sub-objective 3.4c. (Other Appropriate and Compatible Recreational Opportunities That Enhance Visitor Use and Enjoyment of Refuge Lands)

Allow compatible outdoor recreational opportunities on the Farmington River Division that connect people with nature, raise the visibility of the Service and the Refuge System, make the refuge more relevant to the local community, and promote economic activity in the local area.

Rationale:

In addition to the priority public uses, there are other wildlife-dependent, appropriate and compatible recreational activities that can broaden the visitor base, giving people alternative ways to enjoy the natural resources at the division without detrimentally impacting the wildlife resource.

Management Strategies:

(These strategies are dependent on land acquisition from willing landowners and determination that the use is both appropriate and compatible.)

Within 1 year of acquiring land:

- Allow dispersed hiking, snowshoeing, and cross-country skiing.
- Allow pet walking. In order to minimize conflicts with wildlife and other visitors, pets must be on leashes not longer than 10 feet in length.
- Allow recreational gathering of blueberries, blackberries, strawberries, raspberries, mushrooms, fiddleheads, and antler sheds.
- When compatible, allow commercial guiding in support of priority public uses by special use permit.

Within 5 years of CCP approval:

- Work with Friends groups and partners to design and market a virtual geocache course at the division. The course should integrate orienteering with refuge interpretive messages that include linking this division to other refuge properties.

Overview Maromas Conservation Focus Area (Proposed) Middletown, Connecticut

Conservation Focus Area (CFA)—Acreage Profile	Acres	Percentage of CFA
Total CFA Acres to be Conserved by Service	3,935	90.7 %
■ Existing Refuge Ownership in CFA ¹	0	
■ Additional Acres in CFA proposed for Refuge Acquisition ²	3,935	
Existing Acres in CFA Permanently Conserved by Others ^{2,3}	400	9.3 %
Total Acres in CFA ^{2,4}	4,335	100 %

¹Acres from Service's Realty program (surveyed acres); ²Acres calculated using GIS; ³The Service does not plan to acquire existing conserved lands, except under extenuating circumstances (conserved acres from TNC 2010 data); ⁴The Service would conserve up to this number of acres. The Service only acquires lands from willing sellers.

Maromas

The proposed Maromas CFA is a large, forested upland area bounded by the mainstem of Connecticut River on two sides. Its proximity to Middletown and other urbanized areas provides an important opportunity to connect with urban audiences and contribute to the Service's Urban Refuge initiative. The proposed CFA is also directly across the Connecticut River from the refuge's existing Salmon River Division. Conserving these two divisions will help provide connectivity on both sides of the river. The Maromas CFA provides a connection between two undeveloped forest corridors located in the Lower Connecticut River and, further north, along the Bolton Range. These corridors have been recognized for their lack of development, and their importance to neotropical migrants (Comins 2013, personnel communication). The Bolton Range corridor extends into Massachusetts, and provides forest bird nesting habitat. Other existing conserved lands near the Maromas CFA include the Seven Falls, George Dudley Seymour, and Hurd State Parks.

What are the priority habitat types within the proposed CFA? What percentage of the total CFA acreage do they represent?

- Hardwood Forest – 81.3%
- Shrub swamp and Floodplain Forest –1%

For more information on the habitats in the CFA, see map A.5 and table A.4.

What are the resources of conservation concern for the proposed CFA?

As noted in table A.5 below, there are 10 priority refuge resources of concern (PRRC); specifically, terrestrial and aquatic species that may rely upon the diverse habitats in this CFA. There are also habitat types that are not being managed for a particular PRRC species, but are important for their contribution to Biological Integrity Diversity and Environmental Health (BIDEH) of the landscape. The refuge will seek to protect and restore (if necessary) these habitat types. Additionally, we recognize the value of this area to State Species of Greatest Conservation Need (SGCN) and forest interior dwelling bird species. These species and others are discussed further below.

1. Federal Threatened and Endangered Species

The Connecticut River is important migratory and overwintering habitat for shortnose sturgeon, a federally listed species. American eel, a species petitioned for federal listing, spends the majority of its young life in the freshwater systems of this CFA.

2. Migratory Birds

The Connecticut River watershed is a major migration corridor. The lower portion of the watershed (CT and MA) receives higher use by migrants, with this use concentrated in habitats along the Connecticut River main stem (Smith College 2006). The Maromas CFA is situated on the Connecticut River; and the forested habitat and wetlands provide important stopover and breeding habitat for landbirds.

The Maromas CFA provides a connection between two undeveloped forest corridors located in the Lower Connecticut River and, further north, along the Bolton Range. These corridors have been recognized for their lack of development, and their importance to neotropical migrants (Comins 2013, personnel communication). The Bolton Range corridor extends into Massachusetts, and provides forest bird nesting habitat.

The PRRC species for the Maromas CFA includes wood thrush and Louisiana waterthrush. This CFA is located within their core breeding range, and the contiguous forests provide breeding habitat for these and other forest nesting birds, many of which are priority conservation concern species. Bald eagles are also a PRRC species for this CFA. Habitats support nesting, migrating and wintering bald eagle populations.

3. Waterfowl

The freshwater tidal shrub-swamp, marsh and hardwood swamp within the Maromas CFA provide breeding, stopover and wintering habitat for waterfowl. These wetland communities are used by American black duck (a PRRC species), green-winged teal, common merganser, mallards, bufflehead, and wood ducks.

4. Diadromous fish and other aquatic species

The Maromas CFA is located along the Connecticut River which provides important habitat for PRRC species including American shad, shortnose sturgeon, American eel, alewife, blueback herring and Atlantic salmon. The Connecticut River is important migratory habitat for Atlantic salmon, American shad, and shortnose sturgeon (a federally listed species), and spawning habitat for river herring. This area of the Connecticut River is also important as overwintering habitat for shortnose sturgeon. American eel spend the majority of their young life in freshwater systems. Sea lamprey, another species of conservation concern, occurs in this CFA providing important ecological benefits to aquatic systems.

5. Wetlands

An approximately 60 acre tidal wetland complex is located in the Maromas CFA adjacent to the Connecticut River. This wetland complex contains approximately 12 acres of emergent marsh, 5 acres of hardwood swamp and 43 acres shrub-swamp and floodplain forest. Another 20 acres of hardwood swamp is located upstream of this wetland complex, and additional smaller patches are scattered throughout the CFA.

What habitat management activities would likely be a priority on refuge lands within the proposed CFA?

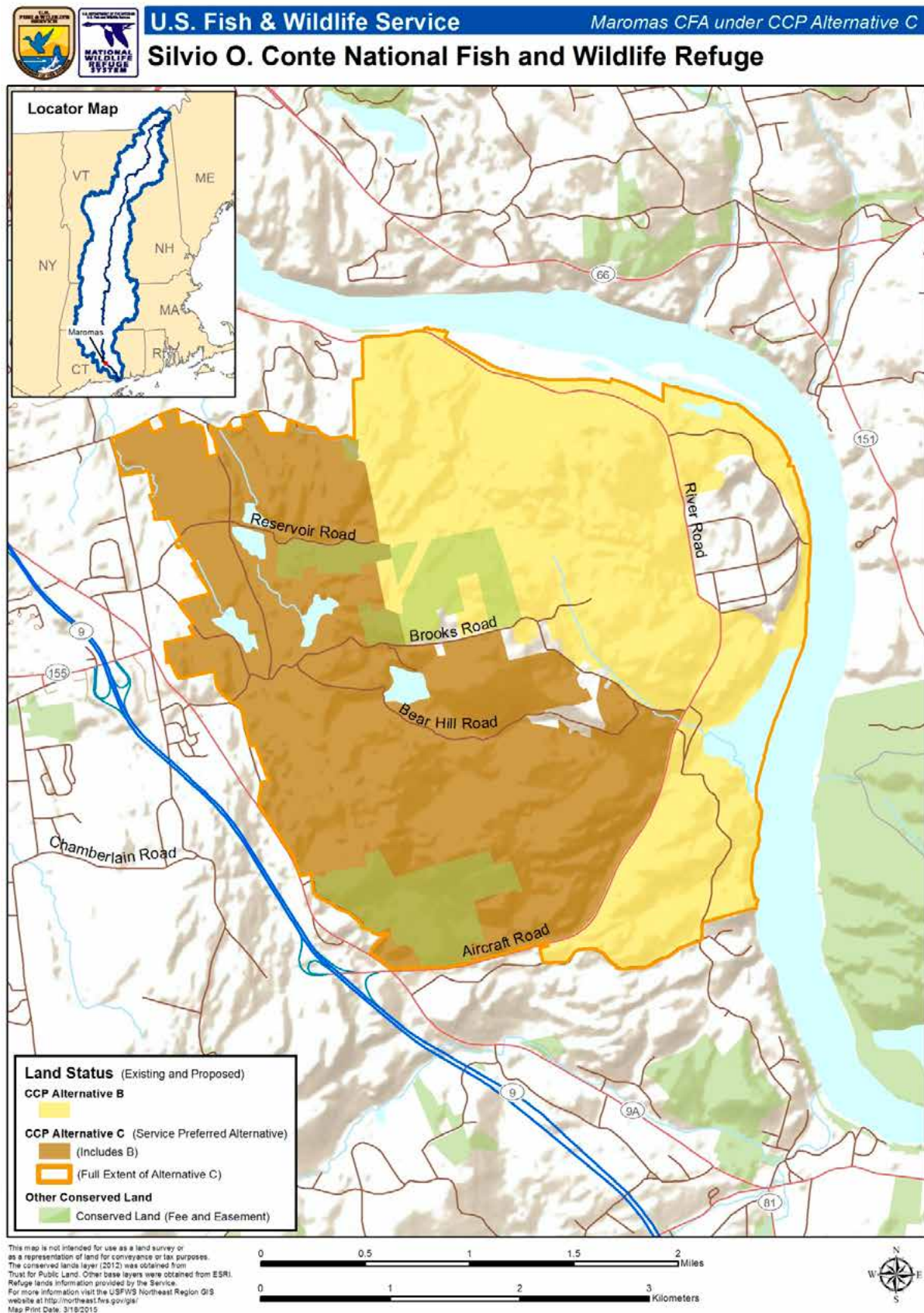
We will conduct a comprehensive, multi-scale wildlife habitat inventory following acquisition. Baseline information on the condition of habitats (i.e., forested, non-forested, and open water habitats) will further inform more detailed, habitat prescriptions within a required step-down Habitat Management Plan (HMP). Once inventory has been completed, then management will focus on maintaining the following conditions:

- Forest management activities will provide a structurally diverse mature forest with connectivity to other large forest blocks, and species composition will be appropriate for site conditions and location. Appendix J provides general forest management guidelines, including descriptions of forestry techniques and explanations about how we will determine where and how to conduct active management.
- We will also manage tidal wetland habitats, and will focus on maintaining the natural hydrology and native species composition. Invasive plant management will be a priority.
- In open water (i.e., stream, rivers, and ponds) habitats, we will focus on maintaining in-stream connectivity (i.e., eliminating barriers to aquatic species passage) and water quality.

What public use opportunities would likely be a priority on refuge lands within the proposed CFA?

We would focus on providing opportunities for the six priority, wildlife-dependent recreational uses: hunting, fishing, wildlife observation and photography, interpretation, and environmental education.

Map A.5. Maromas CFA – Location.



Map A.6. Maromas CPA/CFA – Habitat Types.

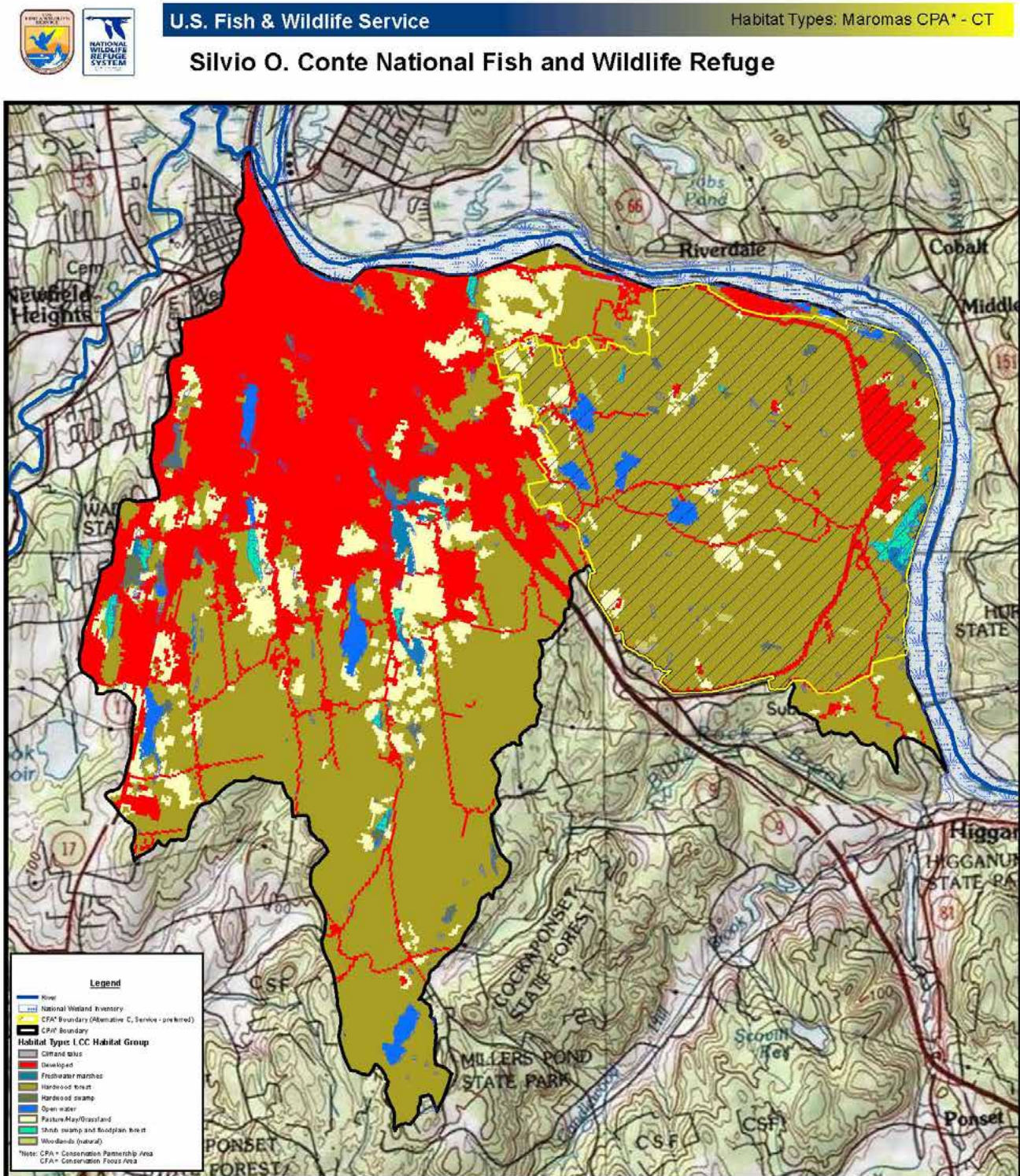


Table A.4. Maromas CPA/CFA – Habitat Types.

LCC General Habitat Type ¹	CPA ²		CFA ³				Percent Habitat ⁸
	Total Acres	Percent of CPA ⁴	Total Acres	Conserved by Others ⁵	USFWS Owned ⁶	Percent CFA ⁷	
Forested Uplands and Wetlands ⁹							
Hardwood forest	8,254	56.5%	3,744	372	0	81.3%	45.4%
Hardwood swamp	147	1.0%	46	0	0	1.0%	31.0%
Shrub swamp and floodplain forest	105	0.7%	47	0	0	1.0%	44.6%
Woodlands (natural)	21	0.1%	21	8	0	0.5%	100.0%
Forested uplands and wetlands subtotal	8,527	58.4%	3,858	381	0	83.8%	45.2%
Non-forested Uplands and Wetlands ⁹							
Cliff and talus	7	0.0%	3	3	0	0.1%	37.5%
Freshwater marshes	84	0.6%	12	0	0	0.3%	13.8%
Pasture/hay/grassland	1,252	8.6%	223	5	0	4.8%	17.8%
Non-forested uplands and wetlands subtotal	1,343	9.2%	237	8	0	5.2%	17.7%
Inland aquatic habitats ⁹							
Open Water	259	1.8%	89	0	0	1.9%	34.6%
Inland aquatic habitats subtotal	259	1.8%	89	0	0	1.9%	34.6%
Other							
Developed	4,470	30.6%	421	7	0	9.1%	9.4%
Other subtotal	4,470	30.6%	421	7	0	9.1%	9.4%
TOTAL	14,598	100.0%	4,605	395	0	100.0%	31.5%

**All acreages are based upon GIS analysis and should be considered estimates

1 - North Atlantic Landscape Conservation Collaborative general habitat typings for USFWS representative species; linked to the National Vegetation Classification System (NVCS). See table A.52 at the end of this appendix for a comparison of these generalized habitat types with the more specific The Nature Conservancy's Northeastern Terrestrial Habitat Classification System. More detailed habitat tables that include the Northeastern Terrestrial Habitat Classification System habitat types are available for each CFA and refuge unit online at: http://www.fws.gov/refuge/Silvio_O_Conte/what_we_do/conservation.html.

2 - Conservation Partnership Area

3 - Conservation Focus Area; representing Service - preferred Alternative C

4 - Percentage of the CPA represented by the habitat type

5- Acres in the CFA currently conserved by others (TNC 2012)

6 - Acres in the CFA currently owned by the USFWS

7 - Percentage of the CFA represented by the habitat type

8 - Percentage of a given habitat within the CPA protected within the CFA under Alternative C

9 - CCP Objective from Silvio O. Conte NFWR Draft CCP/EIS, Chapter 4, Alternative C-Service's Preferred Alternative

Table A.5. Maromas CFA – Preliminary Priority Refuge Resources of Concern.

Priority Refuge Resources of Concern ¹	Habitat Structure ²	Associated Species ³
Forested Uplands and Wetlands⁴		
Hardwood Forest⁵ - 3,744 acres		
Wood Thrush^{A, B, C}	Breeding habitat includes contiguous mature forests (80+ years old) dominated by deciduous tree species, moist soils, a moderate to dense sub-canopy and shrub density, open forest floor and closed canopy (Roth et al. 1996, Rosenberg et al. 2003).	American Redstart ^{I,J} Black-billed Cuckoo ^{I,J} Broad-winged hawk ^{A,I,J} Eastern Hognose Snake ^I Eastern Wood-pewee ^{I,J} Great-crested Flycatcher ^{A,I} Hooded Warbler ^{I,J}
Louisiana Waterthrush^A	Breeding habitat includes contiguous (250+ acres) mature deciduous or mixedwood forests along medium to high-gradient, first to third-order, perennial streams (Mattsson et al. 2009, Degraaf et al., 2001).	Sharp-shinned Hawk ^{I,J} Yellow-throated Vireo ^{A,I,J} Eastern Red Bat^I Ovenbird^I
Bald Eagle^{C, G}	Breeding, migrating and wintering habitat includes large bodies of open water with little human disturbance, and large canopy trees or other elevated sites for nesting, perching, and roosting (DeGraaf et al. 2001).	Red-shouldered Hawk ^{I,J} Purple Finch ^I Barred Owl ^I Eastern Box Turtle ^I Acadian Flycatcher ^{I,J} Blue-headed Vireo ^I Scarlet Tanager ^{A,I,J} Black-and-white Warbler ^{A,I,J} Baltimore Oriole ^{A,I,J} Jefferson Salamander ^I Worm-eating Warbler ^{I,J} Northern Flicker ^{A,I,J} Cerulean Warbler ^{A,I,J}
Hardwood Swamp⁵ - 46 acres		
North-Central Appalachian acidic swamp ^H North-Central Interior and Appalachian rich swamp ^H	Eastern hemlock is usually present and may be dominant in the <i>North-Central Appalachian acidic swamp system</i> . It is often mixed with deciduous wetland trees such as red maple or black tupelo. Species of the genus <i>Sphagnum</i> are an important component of the moss layer. <i>North-Central Interior and Appalachian rich swamps</i> are found in basins where higher pH and/or nutrient levels are associated with a rich flora. Species include red maple, black ash (<i>Fraxinus nigra</i>), as well as calcium loving (calciphilic) herbs. Conifers include American larch, but typically not Northern white cedar, which is characteristic of more northern wetland systems. There may be shrubby or herbaceous openings within the primarily wooded cover. The substrate is primarily mineral soil, but there may be some peat development (Gawler 2008).	Uncommon plant community within the landscape that contributes to BIDEH*

Priority Refuge Resources of Concern ¹	Habitat Structure ²	Associated Species ³
Forested Uplands and Wetlands⁴		
Shrub Swamp and Floodplain Forest⁵ - 47 acres		
American Black Duck ^{A, B, C, G}	Breeding and migrating habitat includes herbaceous wetlands, fens, and flooded meadows and shrub-swamps (Longcore et al. 2000, DeGraaf et al. 2001).	Spotted Turtle ^p Warbling Vireo ^l Willow Flycatcher ^{A, l} American Redstart ^{l, j} Gray Catbird ^{A, l, j} Wood Duck ^j Chestnut-sided Warbler ^l Eastern Towhee ^A Brown Thrasher ^{A, l} Alder Flycatcher ^l
Woodlands (natural)⁵ - 21 acres		
Central Appalachian pine-oak rocky woodland ^H	This system of the central Appalachians encompasses open or sparsely wooded hilltops and outcrops or rocky slopes. The substrate rock is granitic or of other acidic lithology. The vegetation is patchy, with woodland as well as open portions. Pine species are indicative and often are mixed with Oak species. Some areas have a fairly well-developed heath shrub layer, others a grass layer. Conditions are dry and nutrient-poor, and many, if not most, sites have a history of fire (Gawler 2008).	Uncommon plant community within the landscape that contributes to BIDEH*
Non-Forested Uplands and Wetlands⁴		
Freshwater Marshes⁵ - 12 acres		
Laurentian-Acadian freshwater marsh ^H	These freshwater emergent and/or submergent marshes are dominated by herbaceous vegetation. They occur in closed or open basins that are generally flat and shallow. They are associated with lakes, ponds, slow-moving streams, and/or impoundments or ditches. The herbaceous vegetation does not persist through the winter. Scattered shrubs are often present and usually total less than 25% cover. Trees are generally absent and, if present, are scattered. The substrate is typically muck over mineral soil. Vegetation includes common bulrush, narrow-leaf cattail, marsh fern, common jewelweed and sedges (Gawler 2008).	Uncommon plant community within the landscape that contributes to BIDEH*

Priority Refuge Resources of Concern ¹	Habitat Structure ²	Associated Species ³
Non-Forested Uplands and Wetlands⁴		
Pasture/Hay/Grassland⁵ – 223 acres		
Where appropriate and supported by the local community, restore to forest habitat types	See species composition and structure above.	See species associated with forested habitat types above.
Non-Forested Uplands and Wetlands⁴		
Cliff and Talus⁵ – 3 acres		
North-central Appalachian circumneutral cliff and talus ^H	This cliff system occurs at low to mid elevations and consists of vertical or near-vertical cliffs and steep rocky slopes. Substrates include limestone, dolomite and other rocks. The vegetation varies from sparse to patches of small trees, in places forming woodland or even forest vegetation. Ash, basswood and American bladdernut are woody indicators of the enriched setting. The herb layer includes at least some species that are indicators of enriched conditions, e.g., yellow jewelweed, purple cliffbrake, ebony spleenwort, or bluntlobe cliff fern (Gawler 2008) .	Uncommon plant community within the landscape that contributes to BIDEH*

Priority Refuge Resources of Concern ¹	Habitat Structure ²	Associated Species ³
Inland Aquatic Habitats⁴		
Water⁵ – 89 acres		
Alewife ^{B, F, G}	Spawn in ponds and slow-moving streams (USFWS 1996).	Smallmouth Bass ^I Striped Bass ^I Pumpkinseed ^I Longnose Dace ^I Yellow Perch ^I
American Eel ^{E, F}	Migrating and feeding habitat includes lakes, streams and large rivers (USFWS 1996)	
Atlantic Salmon ^{B, F, G}	Spawn in cold freshwater moving streams w/ coarse clean gravel and adequate food/cover. Migrate in large rivers (VTWAP 2005).	
American Shad ^{B, F, G}	Spawn when the water temperature is above 60° F in shoal area of river and lower reaches of larger tributaries (USFWS 1996).	
Blueback Herring ^{F, G}	Spawn in fast moving, shallow water when the river temperature is about 58 F (USFWS 1996).	
Shortnose Sturgeon ^{B, D, F, G}	Spawn in slow-moving, 48 F water of large rivers, and feed in fresh and brackish water along the river bottom (USFWS 1996).	

1 - These species of conservation concern and associated habitats, as well as under-represented and sensitive ecological systems constitute the management focus for the CFA, and recommended for the CPA. They were identified based on specific criteria, and are included in the following plans, databases and/or have Federal status.

A: 2008 Bird Conservation Region 30.

B: 2009 North Atlantic Landscape Conservation Cooperative Development and Operations Plan.

C: 2008 USFWS Birds of Conservation Concern.

D: Federal Threatened and Endangered status as of 2010, including Candidate Species

E: Federal Elevated Concern species or species petitioned for threatened and endangered listing as of 2010

F: 2009-2013 USFWS Northeast Region Fisheries Program Strategic Plan

G: Silvio O Conte Refuge Purpose Species.

H: 2008 Northeastern Terrestrial Habitat Classification System.

2 - This habitat structure will benefit the listed priority refuge resources of concern, and is based on the most recent literature.

3 - These species are a compilation from the following plans, and are associated with the habitat type and/or will benefit from all or a portion of the habitat structure associated with the priority species. This is not a comprehensive list of species.

A: 2008 Bird Conservation Region 30.

I: 2005 Connecticut Comprehensive Wildlife Conservation Strategy

J: 2012 Terrestrial and Wetland Representative Species of the North Atlantic: Species Selected, Considered, and Associated Habitats (Ecological Systems). These species were LCC candidate species and are represented by the selected LCC Representative Species.

4 - CCP Objectives from Silvio O. Conte NFWR Comprehensive Conservation Plan, Chapter 4, Service-preferred Alternative.

5 - These habitat types are based on the North Atlantic Landscape Conservation Cooperative (NALCC) habitat groupings for associated Representative Species, which were derived from The Northeastern Terrestrial Habitat Classification System (NETHCS). See table A.52 for a comparison of the NALCC habitat groupings and NETHCS.

BOLD - These species are LCC Representative Species, which is a species that, because of its habitat use, ecosystem function, or management response, typifies lifecycle or habitat requirements for a larger group of species.

* The Refuge Improvement Act directs the US Fish and Wildlife Service to maintain Biological Integrity, Diversity, and Environmental Health (BIDEH). Elements of BIDEH are represented by native fish, wildlife, plants and their habitats as well as those ecological processes that support them.

Objectives and Strategies for Refuge Lands in the Maromas CFA under Alternative C

Goal 1: Wildlife and Habitat Conservation: Promote the biological diversity, integrity, and resiliency of terrestrial and aquatic ecosystems within the Connecticut River watershed in an amount and distribution that sustains ecological function and supports healthy populations of native fish, wildlife, and plants, especially Federal trust species of conservation concern, in anticipation of the effects of climate, land use, and demographic changes.

Objective 1.1: Forested Uplands and Wetlands

Sub-objective 1.1a. (Hardwood Forest)

Improve the diversity of seral stages and (where and when possible) restore historic composition and structure, and improve landscape connectivity of hardwood forest habitat to support species of conservation concern and aid in climate change adaptation. Management will provide breeding and foraging habitat for priority refuge resources of concern, including wood thrush, Louisiana waterthrush, and bald eagle.

Rationale:

As a result of its history of fire, pathogens, wind events, and other meteorological disturbances and its remarkable cultural legacy of land cover transformations, the entire New England region is strongly shaped by historical processes. In the Maromas CFA, for example, although the landscape was largely forested prior to European settlement, it was highly dynamic in response to changing climatic conditions and natural disturbance processes. European settlement in the 17th and 18th centuries, including sawmills, gristmills, quarries, and shipping docks, initiated a dramatic transformation, as much of the land was deforested and farmed and the remainder was logged, grazed, or burned. More recently, agriculture and forest use have declined, forest area and age have increased, and the land has become more natural than at any time in the preceding centuries. However, despite the natural appearance of much of the Maromas CFA, a legacy of intensive past use remains in vegetation structure and composition, landscape patterns, and ongoing dynamics. This includes the decline in dominant tree species as a consequence of introduced pests and pathogens. The hemlock woolly adelgid, an introduced, aphid-like insect is spreading relentlessly across the range of eastern hemlock and causing widespread decline and mortality of this long-lived and shade tolerant species.

The forests within the CFA that have formed following agricultural abandonment are remarkably more homogeneous than those of four centuries earlier and they include more sprouting and shade-intolerant species and fewer long-lived mature forest tree species (Foster et al. 1998). Modern forests also exhibit much weaker relationships to regional variation in physiography, climate, and soils. And at larger scales, the arrangement and structural and compositional characteristics of plant communities are largely the consequence of species-specific response to land-use histories and other edaphic (soil-related) factors (Foster 1995, Motzkin et al. 1996).

Gap dynamics were the most common natural disturbance, which led naturally to a forest structure dominated by late-successional, multi-aged stands (Foster and Zebryk 1993, Foster et al. 1996, Seymour et al. 2002). A combination of passive management and the application of silvicultural treatments designed to emulate gap dynamics will promote compositional and structural diversity, and move succession forward to emulate later seral stage characteristics. Efforts to regenerate a diversity of species must contend with evidence of reduced diversity or damage to tree seedlings and herbaceous plants attributed to white-tailed deer (Hough 1965, Anderson and Loucks 1979, Tilghman 1989, Rooney and Waller 2003, Côté et al. 2004, see also Rawinski 2008). The structure and composition of late-successional forest ecosystems have been detailed in numerous publications (Foster et al. 1996, Goodburn and Lorimer 1998, Keeton 2006, D'Amato et al. 2009, Curzon and Keeton 2010). Four important structural attributes of late-successional forests are: live large-diameter trees, standing dead trees (snags), fallen trees or logs on the forest floor, and logs in streams. Additional important elements typically include multiple canopy layers, smaller understory trees, canopy gaps, and patchy understory development. These habitat elements have importance to declining mature forest-interior species like wood thrush and Louisiana waterthrush. The wood thrush nests and feeds at the ground level; a sub-canopy layer of shrubs, moist soils and leaf litter are important habitat features (Roth et al. 1996, Rosenberg et al. 2003). Louisiana waterthrush are strongly associated with the swift flowing streams in the forested, steep-sided valleys within Maromas, and

have been shown to decline in response to disturbance of forest cover, streambeds, and associated microhabitat features (Janssen 1987). The wood thrush and Louisiana waterthrush have significance within the Service as NALCC representative species for hardwood forests in the southern sub-region. The occurrence and distribution of many wildlife species are related to key structural habitat features within the forested habitat matrix. High exposed perching and nesting sites often are found in old fields, riparian corridors, and stands where an overstory tree clearly stands above the other forest vegetation; supracanopy white pines and hemlock are examples. The exposed nature of these high perches makes them excellent hunting sites for raptors such as bald eagles that forage in non-forested cover types and open forests. Current breeding territory within Maromas will be managed to perpetuate supracanopy trees.

The management priorities for this habitat type include protection of a large, contiguous forested block within a highly fragmented landscape. This protection coupled with improvements in seral stage diversity will benefit other species of conservation concern like eastern hognose snake, Jefferson salamander, worm-eating warbler, red-shouldered hawk, and hooded warbler.

Management Strategies:

Within 5 years of land acquisition and CCP approval:

- Work with partners, including the State of Connecticut in support of the State Wildlife Action Plan, to ensure management on Service lands complement adjacent land management.
- Identify forest stands with late successional characteristics for passive management, and those where active management is necessary to improve forest structure. Appendix J provides general forest management guidelines, including descriptions of forestry techniques and explanations about how we will determine where and how to conduct active management.

Within 10 years of land acquisition and CCP approval:

- Implement identified active forest management opportunities using accepted silvicultural practices. Appendix J provides general forest management guidelines, including descriptions of forestry techniques and explanations about how we will determine where and how to conduct active management.
- Reserve supracanopy trees in proximity to important habitats during management activities.
- Explore research opportunities with academic partners to address efficacy of forest management in meeting wildlife objectives.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Conduct forest and wildlife inventories.
- Map vernal pools and seeps.
- Map natural communities; protect rare or exemplary examples.

Sub-objective 1.1b. (Shrub Swamps and Floodplain Forest)

Manage shrub swamp and floodplain forest communities to support natural and rare ecological communities, and provide breeding and foraging habitat for priority refuge resources of concern including American black duck.

Rationale:

Shrub swamps are restricted to poorly drained areas, small seepage zones, and wide alluvial stretches of rivers and small streams. Shrubs tend to dominate the wetland, though grasses may be present. Typical species include willow, silky dogwood, speckled alder, white meadowsweet, bluejoint, tall sedge, and common rush (Gawler 2008). Our coarse-scale habitat analysis of this CFA identifies a shrub swamp wetland complex adjacent to the Connecticut River. Flooding of this wetland complex during high water events provide a diversity of plant communities, and habitats for a variety of wildlife species, including American black duck, and other waterfowl species.

American black duck is a species of concern in the North American Waterfowl Management Plan because of historic population declines, and is listed as highest priority for conservation in BCR 30. Black ducks use wetlands, including shrub swamp communities, as stopover habitat during migration, and as breeding and

wintering habitat. Well-concealed nests are placed on the ground in nearby uplands or hummocks in wetlands, and adults and their broods forage on seeds, aquatic vegetation, and invertebrates (Longcore et al. 2000, DeGraaf and Yamasaki 2001). The open water habitat and the adjacent wetland complex provide excellent wintering and migrating habitat for American black ducks. And located on the Connecticut River, an important migration corridor, these wetland communities are used by other waterfowl species during migration including green-winged teal, common merganser, mallards, bufflehead and wood ducks.

Implementation of refuge strategies will begin with a comprehensive, multi-scale wildlife habitat inventory. Wildlife species survival and breeding success is dependent not only on the habitat at a fine scale, but also the surrounding landscape, making it necessary to look at the adjacent habitat conditions and land uses within the CFA and associated landscape. Baseline information on the condition of shrub swamps at the time of acquisition will further inform more detailed habitat prescriptions within a required step-down HMP.

Management Strategies:

Within 5 years of land acquisition and CCP approval:

- Minimize refuge activities that disturb wetland communities.
- Work with partners, including the State, in support of the State Wildlife Action Plan, to ensure management on Service lands complement adjacent land management objectives.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Survey wildlife utilization of wetlands.
- Map natural communities; protect rare or exemplary examples.

Sub-objective 1.1c. (Biological Integrity, Biological Diversity, and Environmental Health)

Where and when appropriate, protect, or restore habitats absent an identified species of conservation concern, recognizing the importance of all habitats in contributing to the biological integrity, diversity, and environmental health of refuge lands and the Watershed.

Rationale:

Achieving the refuge purposes and the Refuge System mission are the paramount considerations for refuge management. Additionally, the Service has policy for maintaining and restoring, where appropriate, refuges' "biological integrity, diversity, and environmental health" (601 FW 3). This policy provides refuge managers with a process to analyze their refuge and recommend the best management direction to prevent further degradation of environmental conditions; and where appropriate, restore lost or severely degraded components. The policy suggests using historic conditions as a reference for comparing the ecosystem's current composition, structure, and functioning to what it was prior to substantial human related changes to the landscape. This comparison can be used to direct management to maintain or restore those natural conditions, to the extent practicable, without jeopardizing refuge purposes. For example, we consider the natural timing and frequency of disturbances, such as fires and flooding, and mimic those processes. In other words, the policy is intended to induce management for native fish, wildlife, and plants and their habitats in natural conditions, and with natural processes, using historic conditions to help identify such conditions and processes (Paveglio et al. 2010). However, we recognize that it is not always possible or desirable to try to mimic historic conditions, particularly in the face of predicted climate and land use changes and other landscape-scale considerations. Historic conditions are only one of many considerations when making decisions about how to manage refuge resources.

Conservationists often use the metaphor of coarse filters and fine filters to convey two complementary strategies for maintaining biological diversity, biological integrity, and environmental health: the first focuses on conserving ecosystems and the second focuses on species (Noss 1987, Hunter 1991, Groves 2003). The coarse-filter approach seeks to protect a representative array of natural ecosystems and their constituent processes, structures, and species (the refuge); however, some species fall through its pores, and coarse filters must be complemented by fine filter strategies tailored to fit particular species (priority species of concern). Sub-objectives throughout this plan generally represent a fine-filter approach — identifying species and their habitats that the Service has identified as priorities based upon our establishing legislation, refuge system mission, regional and national conservation plans, and conversations with conservation partners. In contrast, this sub-objective outlines CFA management that will benefit many of its species, the majority of which will not receive the special, tailored attention of fine-

filter conservation. The BIDEH policy guidance complements coarse-filter conservation in ways that fine-filter conservation misses.

The key idea of BIDEH conservation is that most ecosystems contain certain features that are critical to the welfare of many species; thus, conserving those features can have a positive effect on a large suite of species (biological diversity). Logs in a forest, hedgerows in an agricultural landscape, and streams and pools in many terrestrial ecosystems are all examples of ecosystem features that support far more species than one would predict based on their size alone. The importance of conserving these features is widely recognized, but in an ad hoc, idiosyncratic fashion that often does not recognize the commonality between maintaining a hedgerow, a rock outcrop, and an herbaceous wetland. BIDEH conservation overlaps with many aspects of matrix management and ecosystem management (Lindenmayer and Franklin 2002). A key difference is its specific focus on ecosystem elements, which explicitly complements coarse-filter and fine-filter conservation. Habitats that occur within the Maromas River CFA where species-specific management guidelines are not identified will be managed under the umbrella BIDEH policy. These habitats are most often small or isolated occurrences, but are important in maintaining connectivity within the larger forested matrix, and providing additional structural and species diversity to the matrix. Rocky outcrops and upland meadows, for instance, are anomalies in an otherwise forested landscape. They often have a special flora and fauna—providing sunny, dry sites for reptiles to bask, or nectar producing flowers for foraging butterflies. One could make the case that these outcrops are small, independent ecosystems, but they are really too small to be candidates for a classic coarse-filter strategy and thus best considered in a BIDEH context. This approach will allow the conservation of large numbers of species, the majority of which are too poorly known to be conserved individually (e.g., imagine species conservation plans for particular insects or liverworts). Together, the multiple strategies are reasonably comprehensive because all species and habitats known to be in jeopardy will receive needed attention.

The negative consequences of habitat loss and fragmentation to aspects of biological integrity, diversity, and health have been shown by a large number of theoretical and empirical studies, in different environments, and for a large array of taxa (Fahrig 2003). Our understanding of the current condition of all the habitats considered under this sub-objective and their contribution to the BIDEH of the CFA is poor. A comprehensive forest and wildlife habitat inventory will be necessary to inform more detailed management strategies that provide the full range of natural processes.

Management Strategies:

Within 5 years of CCP approval:

- Work with partners, including the State of Connecticut in support of the State Wildlife Action Plan, to ensure management on Service lands complement adjacent land management objectives.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Conduct habitat and wildlife inventories.
- Map natural communities; protect rare or exemplary examples.

Objective 1.2: Non-forested Uplands and Wetlands

Sub-objective 1.2a. (Pasture/Hay/Grassland)

Where appropriate, and with local support, restore historic composition and structure, and improve landscape connectivity to support forest interior species and provide migratory stopover habitat.

Rationale:

Five percent of the Maromas CFA is typed as pasture, hay, and grassland habitat. While these habitats add to the diversity in the landscape, they also fragment the relatively contiguous forest block of the CFA. Adding up to almost 4,000 forested acres, the Maromas CFA is providing unfragmented habitat on the Connecticut River that is becoming increasingly rare in the southern portion of the watershed, especially with increasing development pressures. The forests within the CFA provide habitat for forest interior species including wood thrush and Louisiana waterthrush that require large tracts of mature forest to maintain viable populations. As forests become fragmented in the landscape, decreased food availability and increased predation and nest parasitism impact forest interior species reproductive success (Wilcove 1985, Brittingham and Goodrich 2010, Richmond et al. 2011, Hagan et al. 2012, Burke and Nol 1998, 2000)

The Maromas CFA also provides a connection between two undeveloped forest corridors located in the Lower Connecticut River and, further north, along the Bolton Range. These corridors have been recognized for their lack of development, and their importance to neotropical migrants. The Bolton Range corridor extends into Massachusetts, and provides forest bird nesting habitat. It is important, therefore, to restore the fragmentation that agricultural land is creating within the Maromas CFA, and maintain the contiguous forest core that is uncommon in the landscape, and provides important wildlife habitat.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- As new pasture, hay, and/or grassland habitat is acquired, evaluate its ecological importance to determine if it should be maintained or if it should be restored to native forest through tree plantings or natural succession.

Sub-objective 1.2b. (Biological Integrity, Biological Diversity, and Environmental Health)

Where a focal species has not been identified, protect and restore habitats that contribute to the biological integrity, diversity, and environmental health of refuge lands and the Connecticut River watershed.

Rationale:

Achieving the refuge purposes and the Refuge System mission are the paramount considerations for refuge management. Additionally, the Service has policy for maintaining and restoring, where appropriate, refuges' "biological integrity, diversity, and environmental health" (601 FW 3). This policy provides refuge managers with a process to analyze their refuge and recommend the best management direction to prevent further degradation of environmental conditions; and where appropriate, restore lost or severely degraded components. The policy suggests using historic conditions as a reference for comparing the ecosystem's current composition, structure, and functioning to what it was prior to substantial human related changes to the landscape. This comparison can be used to direct management to maintain or restore those natural conditions, to the extent practicable, without jeopardizing refuge purposes. For example, we consider the natural timing and frequency of disturbances, such as fires and flooding, and mimic those processes. In other words, the policy is intended to induce management for native fish, wildlife, and plants and their habitats in natural conditions, and with natural processes, using historic conditions to help identify such conditions and processes (Paveglio et al. 2010). However, we recognize that it is not always possible or desirable to try to mimic historic conditions, particularly in the face of predicted climate and land use changes and other landscape-scale considerations. Historic conditions are only one of many considerations when making decisions about how to manage refuge resources.

Conservationists often use the metaphor of coarse filters and fine filters to convey two complementary strategies for maintaining biological diversity, biological integrity, and environmental health: the first focuses on conserving ecosystems and the second focuses on species (Noss 1987, Hunter 1991, Groves 2003). The coarse-filter approach seeks to protect a representative array of natural ecosystems and their constituent processes, structures, and species (the refuge); however, some species fall through its pores, and coarse filters must be complemented by fine filter strategies tailored to fit particular species (priority species of concern). Sub-objectives throughout this plan generally represent a fine-filter approach—identifying species and their habitats that the USFWS has identified as priorities based upon our establishing legislation, refuge system mission, regional and national conservation plans, and conversations with conservation partners. In contrast, this sub-objective outlines CFA management that will benefit many of its species, the majority of which will not receive the special, tailored attention of fine-filter conservation. The BIDEH policy guidance complements coarse-filter conservation in ways that fine-filter conservation misses.

The key idea of BIDEH conservation is that most ecosystems contain certain features that are critical to the welfare of many species; thus, conserving those features can have a positive effect on a large suite of species (biological diversity). Logs in a forest, hedgerows in an agricultural landscape, and streams and pools in many terrestrial ecosystems are all examples of ecosystem features that support far more species than one would predict based on their size alone. The importance of conserving these features is widely recognized, but in an ad hoc, idiosyncratic fashion that often does not recognize the commonality between maintaining a hedgerow, a rock outcrop, and an herbaceous wetland. BIDEH conservation overlaps with many aspects of matrix management and ecosystem management (Lindenmayer and Franklin 2002). A key difference is its specific focus on ecosystem elements, which explicitly complements coarse-filter and fine-filter conservation.

Habitats that occur within the Maromas River CFA where species-specific management guidelines are not identified will be managed under the umbrella BIDEH policy. These habitats are most often small or isolated occurrences, but are important in maintaining connectivity within the larger forested matrix, and providing additional structural and species diversity to the matrix. Rocky outcrops and upland meadows, for instance, are anomalies in an otherwise forested landscape. They often have a special flora and fauna—providing sunny, dry sites for reptiles to bask, or nectar producing flowers for foraging butterflies. One could make the case that these outcrops are small, independent ecosystems, but they are really too small to be candidates for a classic coarse-filter strategy and thus best considered in a BIDEH context. This approach will allow the conservation of large numbers of species, the majority of which are too poorly known to be conserved individually (e.g., imagine species conservation plans for particular insects or liverworts). Together, the multiple strategies are reasonably comprehensive because all species and habitats known to be in jeopardy will receive needed attention.

The negative consequences of habitat loss and fragmentation to aspects of biological integrity, diversity and health have been shown by a large number of theoretical and empirical studies, in different environments, and for a large array of taxa (Fahrig 2003). Our understanding of the current condition of all the habitats considered under this sub-objective and their contribution to the BIDEH of the CFA is limited. A comprehensive forest and wildlife habitat inventory will be necessary to inform more detailed management strategies that provide the full range of natural processes.

Management Strategies:

Within 5 years of CCP approval:

- Work with partners, including the State of Connecticut in support of the State Wildlife Action Plan, to ensure management on Service lands complement adjacent land management objectives.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Conduct habitat and wildlife inventories.
- Map natural communities; protect rare or exemplary examples.

Objective 1.3: Inland Aquatic Habitats

Sub-objective 1.3a. (Open Water)

In collaboration with partners, identify and implement habitat restoration opportunities within the Maromas CFA and Connecticut River to benefit priority refuge resources of concern including American shad, shortnose sturgeon, American eel, alewife, blueback herring, and Atlantic salmon, as well as other species of conservation concern such as sea lamprey.

Rationale:

The Maromas CFA is located along the Connecticut River which provides important habitat for American shad, shortnose sturgeon, American eel, alewife, blueback herring and Atlantic salmon. The Connecticut River is important migratory habitat for Atlantic salmon, American shad, and shortnose sturgeon (a federally listed species), and spawning habitat for river herring. This area of the Connecticut River is also important as overwintering habitat for shortnose sturgeon.

American eel spend the majority of their young life in freshwater systems. American eel enter the Connecticut River as juveniles, and migrate upstream to inhabit bays, estuaries, streams, lakes, and ponds. Eels feed in these aquatic habitats until they reach sexual maturity and begin the long migration to their spawning grounds in the Sargasso Sea (ASMFC 2000).

Another species of conservation concern that utilize freshwater aquatic habitats in this CFA is sea lamprey. Sea lamprey enter the Connecticut River and tributaries to reproduce, and in the process provide important ecological benefits to aquatic systems. Adults transport nutrients between freshwater and saltwater systems, their nest construction restores and enhances streambed structure, abandoned nests are used by other riverine fish, and lamprey eggs and larvae provide food for a variety of species (Kircheis 2004). As with many riverine fish, sea lamprey movement is impeded by barriers on the main stem and tributaries.

Restoring and maintaining the ecological integrity of upland and wetland habitats of the CFA will have positive impacts on water quality of the Connecticut River; and other aquatic systems in the CFA. We will work with partners to analyze current available data, and conduct additional assessments, as needed, to inform more detailed management and monitoring strategies within a required step-down HMP.

Management Strategies:

Within 10 years of approval:

- Work with partners to protect and increase “hard bottom” (e.g., gravel, cobble, or bedrock) for spawning aquatic species.
- Work with partners to reduce combined sewer overflow.

Inventory and Monitoring Strategies:

Within 5 years of approval:

- Work with partners to conduct stream assessments to evaluate stream and fish community health.

Objective 1.4: Coastal Non-forested Uplands (coastal beaches and rocky shores)

Not applicable

Objective 1.5: Coastal Wetlands and Aquatic Habitats (tidal salt marsh and estuary)

Not applicable

Goal 2: Education, Interpretation, and Outreach: Inspire residents and visitors to actively participate in the conservation and stewardship of the exceptional natural and cultural resources in the Connecticut River watershed, and promote a greater understanding and appreciation of the role of the Silvio O. Conte National Fish and Wildlife Refuge in conserving those resources.

Objective 2.1: Environmental Education

In collaboration with public and private educators from all four states in the watershed, lead or facilitate the implementation of structured natural and cultural resource curricula, with a focus on guiding educators and students to develop an awareness of, and concern about, natural and cultural resources and associated challenges; appreciate our conservation history; make informed decisions and work individually or collectively toward solutions; and model responsible environmental stewardship in their everyday lives.

Sub-objective 2.1a. (Environmental Education Planning and Training)

Encourage schools, scout groups, and summer camps to develop curricula that use the Maromas Division as an outdoor classroom.

Rationale:

See environmental education rationale in chapter 4 detailing the importance of environmental education for the Service. Environmental education is one of the six priority, wildlife-dependent recreational uses of the Refuge System. Environmental education is particularly important at Conte Refuge because one of its founding purposes is to provide opportunities for environmental education. Environmental education is an important tool that can help refuge visitors and local residents, particularly students, appreciate the importance of this area to the larger watershed.

Management Strategies:

Within 1 year of CCP approval:

- Encourage schools, scout groups, and summer camps to develop curricula that use the Maromas Division as an outdoor classroom.

Sub-objective 2.1b. (Environmental Education Delivery)

Encourage schools, scout groups, and summer camps to use the Maromas Division as an outdoor classroom.

Rationale:

Because this division will be unstaffed, the majority of environmental education opportunities on this division will be led by partners, volunteers, and local school groups and other educational groups (e.g., scout groups and summer camps).

Management Strategies:

Within 1 year of CCP approval:

- Encourage schools, scout groups, and summer camps to develop curricula that use the Maromas Division as an outdoor classroom.
- As part of Service's Urban Refuge Initiative seek opportunities to work with partners to connect audiences from the Middletown area to nature (e.g., using WoW Express, Adopt-a-Habitat).

Objective 2.2: Interpretation

Develop, lead, and facilitate interpretive programs that emotionally and intellectually connect the audience to natural and cultural resources in the watershed.

Sub-objective 2.2a. (Natural and Cultural Resource Interpretive Planning and Training)

With Friends groups, public and non-profit organizations, and volunteers, offer quality interpretive programming at the Maromas Division. The development of highly trained interpreters will be encouraged by offering interpretive training to Friends' members, partners, and volunteers on a regular basis.

Rationale:

See the rationale in chapter 4 detailing the importance of interpretation for the Service. Interpretation is an important tool that can help refuge visitors and local residents appreciate the importance of this area to the larger watershed. With an ADA compliant trail planned for the site, the Maromas Division will be well suited to support both self-guided, wildlife dependent interpretive experiences, as well as guided interpretive programs that convey messages about the refuge and about the Maromas Division's habitats and cultural resources.

Management Strategies:

Within 5 years of acquiring sufficient land:

- Inventory and evaluate each CFA to determine the appropriate interpretive materials to employ.
- Create meaningful, consistent, thematic statements to be used in the delivery of programming at the Maromas Division.
- Provide resources and trainings to Friends, and volunteers in support of interpretive programs.

Within 10 years of acquiring sufficient land:

- Develop standardized self-guided interpretive services, such as interpretive trails and kiosks, exhibits, and printed media.
- Employ a variety of themed interpretive offerings (e.g., presentations, audio-visual programs, brochures, and exhibits) when creating programming for natural and cultural resource interpretation.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Build an evaluation process that includes formal and informal evaluation to assess the effectiveness of all interpretation programs.

Sub-objective 2.2b. (Natural and Cultural Resource Interpretive Program Delivery)

Collaborate with Friends group, partners, and volunteers to deliver quality natural and cultural resource interpretive programs.

Rationale:

See rationale for sub-objective 2.2a.

Management Strategies:

Within 5 years of acquiring sufficient land:

- Through partners, and Friends group, annually provide quality interpretive programs, exhibits, printed media at the Maromas Division.
- Incorporate thematic statements, measureable objectives, and evaluation measures into all interpretation efforts.
- Publicize interpretive programs through traditional media, on the refuge web site, and digital social media conduits.
- Maintain a supply of print interpretive brochures, i.e., general brochure and bird checklist that incorporate refuge interpretive messages and themes.
- Work with partners to create issue-oriented experiential activities and programs for use at their facilities.

Within 10 years of acquiring sufficient land:

- Contribute refuge interpretive information for scenic byways and other state publications and signs.
- Develop self-guided interpretive messages and use state of the art as well as traditional media (e.g., brochures).

Objective 2.3: Public and Community Outreach

Support, promote, and coordinate a wide range of outreach tools and activities to facilitate and improve communications and relationships with the American public, especially communities, adjacent landowners, and elected officials in the Connecticut River watershed, and to empower citizens to recognize and resolve local natural resource issues and promote conservation and the responsible use of natural resources.

Because the Maromas Division would be unstaffed and does not have refuge facilities, public and community outreach for this site will occur through regular outreach activities at the headquarters and will not specifically occur at this site.

Objective 2.4: Science and Technical Outreach

Facilitate the collection and exchange of information that increases the knowledge and understanding of natural and cultural resources, addresses climate change and other conservation issues, and provides land managers with better information to make management decisions affecting resources.

Because the Maromas Division would be unstaffed and does not have refuge facilities, science and technical outreach for this site will occur through regular outreach activities at the headquarters and will not specifically occur at this site.

Goal 3: Recreation: Promote high-quality, public recreational opportunities in the Connecticut River watershed that are complementary between ownerships and provide regional linkages with emphasis on promoting wildlife-dependent activities that connect people with nature.

Objective 3.1: Hunting

Support quality public hunting opportunities in the Connecticut River watershed to promote a unique understanding and appreciation of natural resources and their management on lands and waters, while also protecting a traditional outdoor pastime deeply rooted in America's natural heritage and conservation history.

Sub-objective 3.1a. (Hunting Opportunity, Access and Infrastructure)

Provide the opportunity for a quality hunting experience based on state regulations.

Rationale:

The Maromas CFA is mostly comprised of floodplain forests along the Connecticut River, and upland forests and wetlands west of the river. This area offers good hunting opportunities for small game, waterfowl, turkey, and white-tailed deer. There is a history of public hunting within the bounds of the CFA at Cockaponset State Forest and Millers Pond State Park. Additional hunting is likely allowed via landowner permission in other parts of the CFA. Hunting, consistent with the final compatibility determination, will be allowed when the Service acquires land that can support hunt seasons. Retaining hunting opportunities on public lands will ensure this wildlife-dependent recreational activity continues and contribute to the state's population management objectives.

Management Strategies:

(These strategies are dependent on land acquisition from willing landowners and determination that hunting is a compatible use.)

Within 1 year of acquiring sufficient land to support hunting seasons:

- Complete all administrative requirements to officially open to hunting consistent with State hunting regulations and, if necessary, additional refuge-specific regulations.
- Allow hunters access to the refuge outside of the normal division open hours (i.e. 30 minutes before sunrise and 30 minutes after sunset) as long as they are engaged in lawful hunting activities.
- Consult with Connecticut Department of Energy and Environmental Protection, Hunting Review Team in evaluating the suitability of new acquisitions to support a safe, manageable hunt program.
- Post newly acquired properties to ensure refuge boundary lines are clearly marked.
- Install an informational kiosk in a conspicuous location to post information on hunting seasons and other notices to visitors.
- Allow temporary tree stands and blinds that meet state hunting regulations and do not harm trees or other refuge vegetation. Tree stands and blinds must have the owner's name and phone number clearly displayed, and they must be removed at the end of the hunt season.

Within 5 years of acquiring land sufficient land to support hunting seasons:

- Work with Connecticut Department of Energy and Environmental Protection to determine whether opportunities exist for state-recognized disabled hunters.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Work with Connecticut Department of Energy and Environmental Protection to evaluate the effectiveness and success of the refuge hunt program in contributing to state population objectives.

Sub-objective 3.1b. (Hunter Education and Outreach)

Provide hunter education classes access to the division and conduct directed outreach to ensure hunters are informed about regulations, hunter ethics, and safety considerations. Develop programs, including brochures, signage, website pages, media releases, etc. to increase interest in hunting at the division.

Rationale:

Hunting is a priority public use that also serves as a population management tool. Providing hunter education instructors the opportunity to use the division with their classes will strengthen connections to the hunting community and student understanding of the role hunting plays in wildlife management. Making relevant information readily available to hunters through a variety of media will improve the quality of the hunting experience.

Management Strategies:

(These strategies are dependent on land acquisition from willing landowners and determination that hunting is a compatible use at the division.)

Within 1 year of acquiring land sufficient land to support hunting seasons:

- Produce a hunt brochure that includes a hunt map and information on regulations, hunter ethics, safety considerations, etc. and make it available on the refuge website, at the Maromas Division kiosks, through a friends group, and in local businesses.
- Provide visitors with general information on the hunting program and refuge-specific and State regulations through the refuge website, information signs, and a hunting brochure. In all materials related to the hunting program, promote and encourage the use of lead-free ammunition.
- Work with the State to identify and evaluate the impacts associated with requiring the use of non-toxic ammunition for hunting on refuge lands.

Within 5 years of acquiring land sufficient land to support hunting seasons:

- Work with Connecticut Department of Energy and Environmental Protection to encourage youth hunting at the division as a means of introducing young people to this traditional recreation activity.
- Offer to host hunter education field courses.
- Develop a system to monitor and evaluate the hunting program with hunters and other users to determine if the objective is being met and to allow for adaptive management.

Objective 3.2: Fishing

Support quality, public fishing opportunities in the Connecticut River watershed to promote an understanding and appreciation of natural resources and their management on lands and waters, while also protecting a traditional outdoor pastime deeply rooted in the America's natural heritage and conservation history.

Sub-objective 3.2a. (Fishing Opportunities, Access, and Infrastructure)

Provide quality fishing opportunities at the Maromas Division after completing all administrative procedures to officially open refuge lands to fishing, based on Connecticut Department of Energy and Environmental Protection regulations, and division-specific conditions, if necessary.

Rationale:

The principal fishing resources on this CFA are the Connecticut River, several small reservoirs and associated streams (i.e. Hubbard Brook and Reservoir Brook) that support game fish. Most people fish the Connecticut River from boats, but allowing bank fishing on a Maromas Division would provide the public with another recreational opportunity. Fishing is a popular activity in this area and would continue under Service ownership, consistent with the final compatibility determination. Retaining fishing opportunities conforms to historic use on CFA and much of the surrounding land in the area.

Management Strategies:

(These strategies are dependent on land acquisition from willing landowners and determination that fishing is a compatible use.)

Within 1 year of acquiring land with fishable waters:

- Complete all administrative requirements to officially open to fishing consistent with State hunting regulations and, if necessary, additional refuge-specific regulations.
- The Maromas Division would be open to visitors actively engaged in fishing during the seasons and times established by the state in their annual fishing regulations.
- Post newly acquired properties to ensure refuge boundary lines are clearly marked.

- Install an informational kiosk in a conspicuous location to post information on fishing seasons and other notices to visitors.

Within 5 years of acquiring land with fishable waters:

- Work with the Connecticut Department of Energy and Environmental Protection to inventory and assess fish populations on the division.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Develop a system to monitor and evaluate the fishing program with anglers and other users to determine the objective is being met and to allow for adaptive management.

Sub-objective 3.2b. (Angler Education and Outreach)

Develop programs, including brochures, signage, website pages, media releases, etc. to inform visitors of fishing opportunities at the division.

Rationale:

Fishing is a priority public use and a traditional use in the CFA. If land is acquired, the refuge will make information readily available to interested anglers regarding opportunities to fish on Service-owned land, location of fishable waters, and the available game fish.

Management Strategies:

(These strategies are dependent on land acquisition from willing landowners and determination that fishing is a compatible use.)

Within 1 year of acquiring land with fishable waters:

- Produce a fishing brochure that includes information on regulations, angler ethics, safety considerations, etc. and make it available on the refuge website, at informational kiosks, and in local businesses. In all materials related to the fishing program, promote use of lead-free tackle.

Objective 3.3: Wildlife Observation and Photography

Support quality, public opportunities to observe and photograph wildlife in the Connecticut River watershed in a variety of natural habitats to connect a broad spectrum of people with nature.

Sub-objective 3.3a. (Infrastructure and Access for Wildlife Observation and Photography)

Provide quality opportunities for wildlife observation and photography for people of all physical abilities.

Rationale:

Wildlife viewing and photography is a priority public use on national wildlife refuges and a popular recreational activity. Opening acquired land in this new division to wildlife observation and photography will provide visitors a chance to see and photograph a variety of wildlife species in their native habitats, while learning more about the Service, Refuge System, and the refuge.

Management Strategies:

(These strategies are dependent on land acquisition from willing landowners and determination that wildlife observation and photography are compatible uses at the division.)

Within 1 year of acquiring land:

- Consistent with the final compatibility determination, allow public access from 30 minutes before sunrise to 30 minutes after sunset with the exception listed for hunters and anglers.
- Install an informational kiosk in a conspicuous location to post information on wildlife observation and photography opportunities, and other notices to visitors.

Within 5 years of acquiring land:

- Develop a public access strategy and required planning (i.e. NEPA, compatibility determination) that includes consideration of developed trails, parking, kiosks, viewing platforms, blinds, interpretation, signage, etc.

Within 15 years of acquiring land:

- Implement the visitor use enhancements identified in the public access strategy and the refuge Visitor Services Plan.

Sub-objective 3.3b. (Wildlife Observation and Photography Aids)

Offer viewing and photography aids that enhance the visitor experience. Use a variety of methods to reach a broad spectrum of people. Work closely with a friends group and other partners that host events designed to view wildlife on the division.

Rationale:

By providing new visitors a quality experience they are more likely to return and share their experiences with others. Enhancing the opportunities for visitors to view and photograph wildlife will give them a better appreciation of the refuge, Refuge System and Service. One way to accomplish this is to offer sufficient information and aids to attract a variety of visitors through a variety of media.

Management Strategies:

(These strategies are dependent on land acquisition from willing landowners and determination that wildlife observation and photography are compatible uses at the division.)

Within 1 year of acquiring land:

- Allow photography blinds that do not negatively impact wildlife behavior or conflict with other visitors. Blinds must be removed each day, unless arrangements have been made via a special use permit.

Within 5 years of acquiring land:

- Develop interpretive panels describing typical wildlife on the refuge, bird migration patterns, and other messages we want to convey to visitors.
- Sponsor wildlife observation events such as International Migratory Bird Day, the Big Sit, etc.
- Encourage local schools and environmental organizations to offer wildlife-centered trips to the refuge.
- Produce a list of wildlife species and associated habitats, and other conservation information on the division for distribution at informational kiosks, the refuge website, and other popular media.

Within 10 years of acquiring land:

- Develop a public access strategy and required NEPA documentation that includes consideration of developed trails, parking, kiosks, viewing platforms, blinds, interpretation, signage, etc.

Within 15 years of acquiring land:

- Implement the visitor use enhancements identified in the public access strategy and the refuge visitor services plan.

Sub-objective 3.3c. (Watershed-based Partner Initiatives)

Not applicable

Objective 3.4: Other Recreational Activities

In order to reach a broader demographic, support non-priority outdoor recreational opportunities and public access to quality, nature-based experiences throughout the Connecticut River watershed that facilitate and improve community relationships, raise awareness and an appreciation for conserving natural resources, and garner support for the National Wildlife Refuge System.

Sub-objective 3.4a. (Regional Water-based Trail Initiatives and Opportunities Including Refuge Lands)

Develop compatible opportunities on the Maromas Division that support regional water-based trail initiatives to connect people with nature, raise the visibility of the Service and the Refuge System, make the refuge more relevant to the local community, and to promote economic activity in the local area.

Rationale:

Regional water-based trails give individuals opportunities to engage in outdoor recreational opportunities in the Connecticut River watershed, such as fishing, boating, and wildlife observation. Examples include the Connecticut River waterway route. Where appropriate, we will work with these partners to promote, and distribute information about, these opportunities.

Management Strategies:

Within 5 years of acquiring land:

- Work with public and private partners to determine whether and what roles this division might contribute to a Connecticut River waterway route.
- As lands are acquired, evaluate any water trails (e.g., canoe/kayak trails) that part of a regional or State network for their compatibility.

Sub-objective 3.4b. (Regional Land-based Trail Initiatives and Opportunities Including Refuge Lands)

Develop compatible opportunities on the Maromas Division that support regional land-based trail initiatives to connect people with nature, raise the visibility of the Service and the Refuge System, make the refuge more relevant to the local community, and to promote economic activity in the local area.

Rationale:

Regional land-based trails give individuals opportunities to engage in outdoor recreational opportunities in the Connecticut River watershed, such as hiking, wildlife observation, and interpretation. Where appropriate, we will work with these partners to promote, and distribute information about, these opportunities.

Management Strategies:

Within 5 years of acquiring land:

- As lands are acquired, evaluate any existing trails (e.g., hiking trails, snowmobile trails, horseback riding trails) that are part of an established regional or State network to determine if they are appropriate and compatible uses for the refuge.

Sub-objective 3.4c. (Other Appropriate and Compatible Recreational Opportunities That Enhance Visitor Use and Enjoyment of Refuge Lands)

Allow compatible outdoor recreational opportunities on the Maromas Division that connect people with nature, raise the visibility of the Service and the Refuge System, make the refuge more relevant to the local community, and promote economic activity in the local area.

Rationale:

In addition to the priority public uses, there are other wildlife-dependent, appropriate and compatible recreational activities that can broaden the visitor base, giving people alternative ways to enjoy the natural resources at the division without detrimentally impacting the wildlife resource.

Management Strategies:

(These strategies are dependent on land acquisition from willing landowners and determination that a particular use is compatible.)

Within 1 year of acquiring land:

- Allow dispersed hiking, snowshoeing, and cross-country skiing.
- Allow pet walking. In order to minimize conflicts with wildlife and other visitors, pets must be on leashes not longer than 10 feet in length.

- Allow recreational gathering of blueberries, blackberries, strawberries, raspberries, mushrooms, fiddleheads, and antler sheds.
- When compatible, allow commercial guiding in support of priority public uses by special use permit.
- Allow canoeing and kayaking in acquired coves and waterways.

Within 5 years of CCP approval:

- Work with friends groups and partners to design and market a virtual geocache course at the division. The course should integrate orienteering with refuge interpretive messages that include linking this division to other refuge divisions and units.

Overview Pyquag Conservation Focus Area (Proposed)

East Hartford, Wethersfield, Glastonbury, and Rocky Hill, Connecticut

Conservation Focus Area (CFA)—Acreage Profile	Acres	Percentage of CFA
Total CFA Acres to be Conserved by Service	2,956	79.6 %
■ Existing Refuge Ownership in CFA ¹	0	
■ Additional Acres in CFA proposed for Refuge Acquisition ²	2,956	
Existing Acres in CFA Permanently Conserved by Others ^{2,3}	756	20.4 %
Total Acres in CFA ^{2,4}	3,712	100 %

¹Acres from Service's Realty program (surveyed acres); ²Acres calculated using GIS; ³The Service does not plan to acquire existing conserved lands, except under extenuating circumstances (conserved acres from TNC 2010 data); ⁴The Service would conserve up to this number of acres. The Service only acquires lands from willing sellers.

What specific criteria and/or considerations drove the selection of this CFA?

Pyquag was a SFA in the 1995 Conte FEIS. The Pyquag CFA area is considered important floodplain forest by The Nature Conservancy and the proposed CFA would allow for the restoration and conservation of the floodplain forest and associated wetland complex. Habitat conservation in this CFA will help allow for the landward migration of the coastal wetland complex (salt-, brackish-, and freshwater tidally influenced wetlands) due to climate change.

What are the priority habitat types within the proposed CFA? What percentage of the total CFA acreage do they represent?

- Pasture/Hay/Grassland – 29.3%
- Hardwood Swamp – 19.8%
- Freshwater Marsh – 6.2%

For more information on the habitats in the CFA, see map A.8 and table A.6.

What are the resources of conservation concern for the proposed CFA?

As noted in table A.7 below, there are seven priority refuge resources of concern (PRRC) aquatic and terrestrial species that rely upon the open water and wetland habitats in this CFA. There are also habitat types that are not being managed for a particular PRRC species, but are important for their contribution to Biological Integrity Diversity and Environmental Health (BIDEH) of the landscape. This includes floodplain habitats which have undergone significant alteration within the Connecticut River watershed. The refuge will seek to protect and restore (if necessary) these, and other PRRC habitat types. Additionally, we recognize the value of this area to State Species of Greatest Conservation Need (SGCN) and migratory birds. These species and habitats are discussed further below.

1. Federal Threatened and Endangered Species

This section of the Connecticut River is important migratory and overwintering habitat for the federally listed shortnose sturgeon. American eel, a species petitioned for federal listing, also occurs in the freshwater systems of this CFA. Eels enter the Connecticut River as juveniles, and migrate upstream to feed in aquatic habitats until they reach sexual maturity and begin the long migration to their spawning grounds in the Sargasso Sea (ASMFC 2000).

2. Migratory Birds

The Connecticut River watershed is a major migration corridor. The lower portion of the watershed (CT and MA) receives higher use by migrants, with this use concentrated in habitats along the Connecticut River main stem (Smith College 2006). The Pyquag CFA is situated on the Connecticut River, and the forested habitats and wetlands provide very important stopover habitat for landbirds, shorebirds, and waterbirds.

3. Waterfowl

The freshwater marshes, hardwood swamps, and open water of the Connecticut River provide important stopover areas for migrating and wintering waterfowl. Large concentrations of American black duck (a PRRC species), green-winged teal, and mallard use habitats in this CFA. Other species include Canada geese, bufflehead, canvasback, wood duck, northern pintail, gadwall, and mergansers.

4. Diadromous fish and other aquatic species

The Pyquag CFA straddles the Connecticut River which provides important habitat for PRRC species including American shad, shortnose sturgeon, American eel, alewife, blueback herring and Atlantic salmon. Shortnose sturgeon is also a federally listed species, and American eel has been petitioned for listing under the ESA. Keeney and Wethersfield Coves, located in past river channels, and Crow Point (a borrow pit for I-91) are accessible from the Connecticut River and provide additional open water habitat for these species. There are also various brooks that feed into the Connecticut River and Coves that are important for river herring. Sea lamprey, another species of conservation concern, occurs in this CFA providing important ecological benefits to aquatic systems.

5. Wetlands

More commonly known locally as the Great Meadows, this proposed division lies in a large floodplain (4,310 acres) in Wethersfield, Glastonbury and Rocky Hill plus a small portion of East Hartford (Keeney Cove). The floodplain is roughly 5 miles long and about 2 ½ miles wide. It is 4 to 5 feet above the normal river level, while the terraces where the towns are located are 20 to 30 feet above the river. Annual spring floods generally rise 10 to 15 higher than the normal river level, and flood about 2,740 acres. Although currently almost entirely in agricultural use, the floodplain would naturally support a forest of silver maple, cottonwood, sycamore, box elder and willow. A couple of floodplain forests are ranked as exemplary by the State natural heritage program.

Where older channels of the river occur, there are several marsh types present, varying from cattail marsh to shrub marsh. Several of the freshwater tidal marshes are ranked as exemplary by the State natural heritage program. The unusual plants green dragon and the golden club (State species of special concern) are both found in wetlands here.

What habitat management activities would likely be a priority on refuge lands within the proposed CFA?

We will conduct a comprehensive, multi-scale wildlife habitat inventory following acquisition. Baseline information on the condition of habitats (i.e., forested, non-forested and open water habitats) will further inform more detailed, habitat prescriptions within a required step-down Habitat Management Plan (HMP). Once inventory has been completed, then management will focus on maintaining the following conditions:

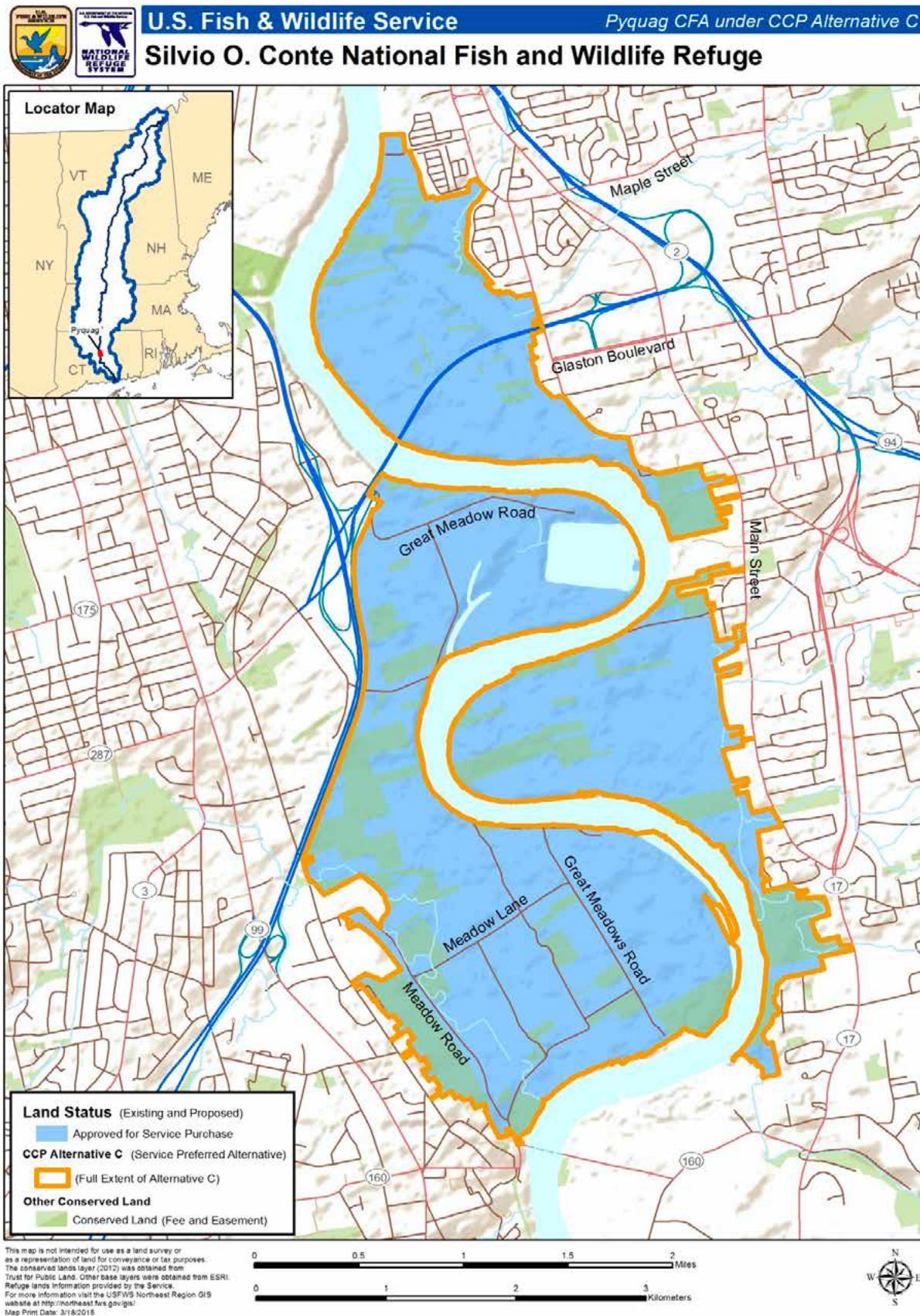
- Forest management activities will focus on restoration of degraded floodplains, including where appropriate, restoring the primary natural disturbance mechanism (seasonal flooding) and species composition and structure to accepted historical conditions. Management of upland forests will improve structural diversity and species composition will be appropriate for site conditions and location. Appendix J provides general forest management guidelines, including descriptions of forestry techniques and explanations about how we will determine where and how to conduct active management.

- Non-forest management activities will occur within the emergent wetland habitats, and will focus on maintaining the natural hydrology and native species composition. Invasive plant management will be a priority.
- Open water (stream, rivers, and coves) will focus on maintaining stream connectivity, including connectivity between the coves and the Connecticut River, and providing outstanding water quality.

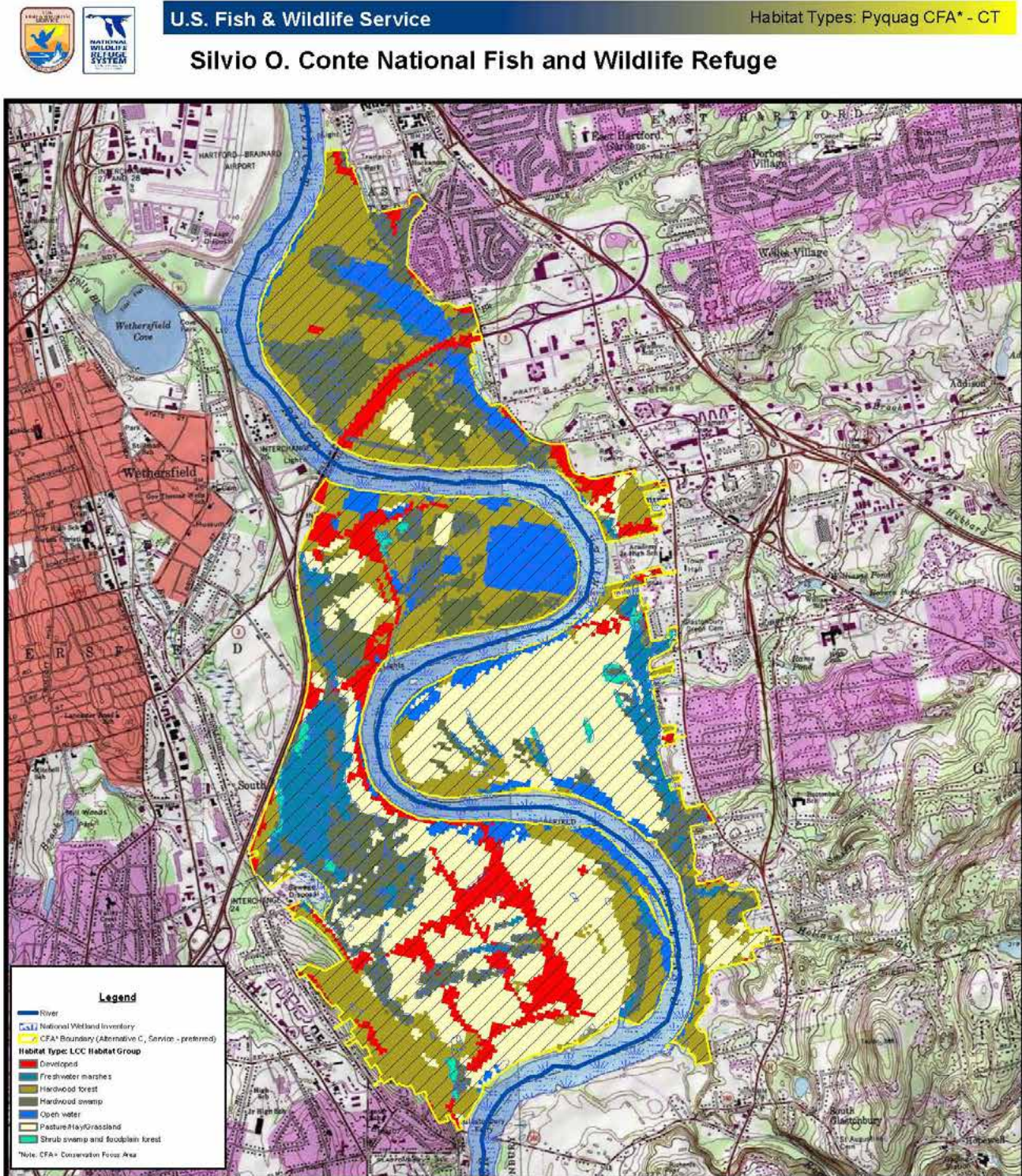
What public use opportunities would likely be a priority on refuge lands within the proposed CFA?

We would focus on providing opportunities for the six priority, wildlife-dependent recreational uses: hunting, fishing, wildlife observation and photography, interpretation, and environmental education.

Map A.7. Pyquag CFA – Location.



Map A.8. Pyquag CFA – Habitat Types.



This map is designed for refuge management.
It is not intended for use as a land survey or
as a representation of land for conveyance or tax purposes.
For more information visit the USFWS Northeast Region GIS
website at <http://northeast.fws.gov/gis/>
Date: 7/2/2013

Table A.6. Pyquag CFA – Habitat Types.

LCC General Habitat Type ¹	CFA ²			Percent CFA ⁵
	Total Acres	Conserved by Others ³	USFWS Owned ⁴	
Forested Uplands and Wetlands ⁶				
Hardwood forest	933	223	0	25.2%
Hardwood swamp	734	141	0	19.8%
Shrub swamp and floodplain forest	32	9	0	0.9%
Forested uplands and wetlands subtotal	1,699	372	0	45.8%
Non-forested Uplands and Wetlands ⁶				
Freshwater marshes	229	99	0	6.2%
Pasture/hay/grassland	1,085	163	0	29.3%
Non-forested uplands and wetlands subtotal	1,314	262	0	35.4%
Inland aquatic habitats ⁶				
Open Water	329	45	0	8.9%
Inland aquatic habitats subtotal	329	45	0	8.9%
Other				
Developed	367	76	0	9.9%
Other subtotal	367	76	0	9.9%
TOTAL	3,709	755	0	100.0%

**All acreages are based upon GIS analysis and should be considered estimates

1 - North Atlantic Landscape Conservation Collaborative general habitat typings for USFWS representative species; linked to the National Vegetation Classification System (NVCS). See table A.52 at the end of this appendix for a comparison of these generalized habitat types with the more specific The Nature Conservancy's Northeastern Terrestrial Habitat Classification System. More detailed habitat tables that include the Northeastern Terrestrial Habitat Classification System habitat types are available for each CFA and refuge unit online at: http://www.fws.gov/refuge/Silvio_O_Conte/what_we_do/conservation.html.

2 - Conservation Focus Area; representing Service - preferred Alternative C

3- Acres in the CFA currently conserved by others (TNC 2012)

4 - Acres in the CFA currently owned by the USFWS

5 - Percentage of the CFA represented by the habitat type

6 - CCP Objective from Silvio O. Conte NFWR Draft CCP/EIS, Chapter 4, Alternative C-Service's Preferred Alternative

Table A.7. Pyquag CFA – Preliminary Priority Refuge Resources of Concern

Priority Refuge Resources of Concern ¹	Habitat Structure ²	Associated Species ³
Forested Uplands and Wetlands⁴		
Hardwood Forest⁵ - 933 acres		
<p>Appalachian (hemlock)-northern hardwood forest^H</p> <p>Northeastern interior dry-mesic oak forest^H</p>	<p>Northern hardwoods such as sugar maple, yellow birch, and American beech are characteristic of the <i>Appalachian (hemlock)-northern hardwood forest</i>, either forming a deciduous canopy or mixed with eastern hemlock (or in some cases white pine). Other common and sometimes dominant trees include Oak spp. (most commonly red oak, tulip poplar, black cherry, and black birch. <i>Northeastern interior dry-mesic oak forests</i> are typically closed-canopy forests, though there may be areas of patchy-canopy woodlands. Soils are acidic and relatively infertile but not strongly drought prone. Oak species characteristic of dry-mesic conditions (e.g., red oak, white oak, black oak, and scarlet oak and hickory are dominant in mature stands. Chestnut oak may be present but is generally less important than the other oak species. American chestnut was a prominent tree before chestnut blight eradicated it as a canopy constituent. Red maple, black birch, and yellow birch may be common associates. With a long history of human habitation, many of the forests are early in their development following disturbance, where White pine, Virginia pine, or tulip poplar may be a dominant or codominant presence. On hills and slopes within these forests, pockets with impeded drainage may support small isolated wetlands, including non-forested seeps or forested wetlands with red maple, swamp white oak, or black tupelo characteristic (Gawler 2008).</p>	<p>Migratory species</p>

Priority Refuge Resources of Concern ¹	Habitat Structure ²	Associated Species ³
Forested Uplands and Wetlands⁴		
Hardwood Swamp⁵ - 734 acres		
<p>North-Central Appalachian acidic swamp^H</p> <p>North-central interior wet flatwoods^H</p>	<p><i>North-Central Appalachian acidic swamps</i> are found in basins or on gently sloping seepage lowlands. The acidic substrate is mineral soil, often with a component of organic muck (organic matter 20 to 65 percent); if peat (greater than 65 percent organic material) is present, it usually forms an organic top soil horizon over mineral soil rather than a true peat substrate. Eastern hemlock is usually present and may be dominant. It is often mixed with deciduous wetland trees such as red maple or black tupelo. Species of the genus <i>Sphagnum</i> are an important component of the moss layer. <i>North-central interior wet flatwoods</i> usually occurs on poorly drained uplands or in depressions associated with glacial features such as tillplains, akeplains or outwash plains. Soils often have an impermeable or nearly impermeable clay layer that can create a shallow, perched water table. Saturation can vary, with ponding common during wetter seasons, and drought possible during the summer and autumn months. These fluctuating moisture levels can lead to complexes of forest upland and wetland species occurring within this system. Pin oak typically dominates and is often associated with swamp white oak and Red maple. American sweetgum and black tupelo are also common associates. Understory herbaceous and shrub species present in examples of this system can vary. Some common species include sedges, cinnamon fern, common buttonbush, alder, and holly (Gawler 2008).</p>	Migratory species
Shrub Swamp and Floodplain Forest⁵ - 32 acres		
American Black Duck^{A, B, C, G}	Breeding and migrating habitat includes herbaceous wetlands, fens, and flooded meadows and shrub-swamps (Longcore et al. 2000, DeGraaf et al. 2001).	<p>Northern Harrier^{L,J}</p> <p>Wood Duck^{A,I,J}</p> <p>Green-winged Teal^{A,I,J}</p> <p>Snowy Egret^{A,I,J}</p> <p>Rusty Blackbird^A</p> <p>American Bittern^{A,I}</p> <p>Common Merganser^I</p> <p>Bufflehead^A</p> <p>Canada Goose, NAP^{A,J}</p> <p>Canada Goose, AP^{A,J}</p> <p>Virginia Rail^I</p> <p>Marsh Wren^{A,I}</p> <p>Mallard^{A,I,J}</p> <p>Davis' Sedge^I</p> <p>Waputo^I</p> <p>Gray Catbird^{A,I,J}</p> <p>Willow Flycatcher^{A, I}</p> <p>Warbling Vireo^I</p> <p>Spotted Turtle^I</p> <p>Eastern Kingbird^{A,I,J}</p>

Priority Refuge Resources of Concern ¹	Habitat Structure ²	Associated Species ³
Non-Forested Uplands and Wetlands⁴		
Freshwater Marshes⁵ - 229 acres		
American Black Duck^{A, B, C, G}	Breeding and migrating habitat includes herbaceous wetlands, fens, and flooded meadows and shrub-swamps (Longcore et al. 2000, DeGraaf et al. 2001).	Northern Harrier ^{I, J} Wood Duck ^{A, I, J} Green-winged Teal ^{A, I, J} Snowy Egret ^{A, I, J} Rusty Blackbird ^A American Bittern^{A, I} Common Merganser ^I Bufflehead ^A Canada Goose, NAP ^{A, J} Canada Goose, AP ^{A, J} Virginia Rail^I Marsh Wren^{A, I} Mallard ^{A, I, J} Davis' Sedge ^I Waputo ^I Gray Catbird ^{A, I, J} Willow Flycatcher^{A, I} Warbling Vireo^I Spotted Turtle^I Eastern Kingbird ^{A, I, J}
Non-Forested Uplands and Wetlands⁴		
Pasture/Hay/Grassland⁵ – 1,085 acres		
Where appropriate and supported by the local community, restore to floodplain forest	<i>Laurentian-Acadian floodplain forest</i> occur along medium to large rivers, and include a matrix of upland and wetland habitats. Floodplain forests, with silver maple are characteristic, as well as herbaceous sloughs and shrub wetlands. Most areas are underwater each spring; micro-topography determines how long the various habitats are inundated. Associated trees include red maple and American hornbeam, the latter frequent but never abundant. On terraces or in more calcium rich areas, sugar maple or red oak may be locally prominent, with yellow birch and ash, black willow is characteristic of the levees adjacent to the channel. Common shrubs include silky dogwood and viburnum. The herb layer in the forested portions often features abundant spring ephemerals, giving way to a fern-dominated understory in many areas by mid-summer. Non-forested wetlands associated with these systems include shrub-dominated and grass-non-woody vegetation (Gawler 2008).	Migratory Species

Priority Refuge Resources of Concern ¹	Habitat Structure ²	Associated Species ³
Inland Aquatic Habitats⁴		
Water⁵ – 329 acres		
American Eel ^{E, F}	Migrating and feeding habitat includes lakes, streams and large rivers (USFWS 1996)	Smallmouth Bass ^I Burbot ^I Striped Bass ^I Pumpkinseed ^I Sea Lamprey ^I Longnose Dace ^I Yellow Perch ^I
Shortnose Sturgeon ^{B, D, F, G}	Spawn in slow-moving, 48 F water of large rivers, and feed in fresh and brackish water along the river bottom (USFWS 1996).	
Alewife ^{B, F, G}	Spawn in ponds and slow-moving streams (USFWS 1996).	
Atlantic Salmon ^{B, F, G}	Spawn in cold freshwater moving streams w/coarse clean gravel and adequate food/cover. Migrate in large rivers (VTWAP 2005).	
Blueback Herring ^{F, G}	Spawn in fast moving, shallow water when the river temperature is about 58 F (USFWS 1996).	
American Shad ^{B, F, G}	Spawn when the water temperature is above 60° F in shoal area of river and lower reaches of larger tributaries (USFWS 1996).	
American Black Duck ^{A, B, C, G}	Migrating habitat includes open water, such as, estuaries, coves or bays with submerged aquatic vegetation, mollusks and crustaceans for foraging (DeGraaf et al. 2001).	Canada Goose, Atlantic ^A Canada Goose, North Atlantic ^A Bufflehead^A Mallard ^A Snowy Egret ^{A, I, J} Bald Eagle ^{A, I} Wood Duck ^A Green-winged Teal ^A

1 - These species of conservation concern and associated habitats, as well as under-represented and sensitive ecological systems constitute the management focus for the CFA, and recommended for the CPA. They were identified based on specific criteria, and are included in the following plans, databases and/or have Federal status.

A: 2008 Bird Conservation Region 30.

B: 2009 North Atlantic Landscape Conservation Cooperative Development and Operations Plan.

C: 2008 USFWS Birds of Conservation Concern.

D: Federal Threatened and Endangered status as of 2010, including Candidate Species

E: Federal Elevated Concern species or species petitioned for threatened and endangered listing as of 2010

F: 2009-2013 USFWS Northeast Region Fisheries Program Strategic Plan

G: Silvio O Conte Refuge Purpose Species.

H: 2008 Northeastern Terrestrial Habitat Classification System.

2 - This habitat structure will benefit the listed priority refuge resources of concern, and is based on the most recent literature.

3 - These species are a compilation from the following plans, and are associated with the habitat type and/or will benefit from all or a portion of the habitat structure associated with the priority species. This is not a comprehensive list of species.

A: 2008 Bird Conservation Region 30.

I: 2005 Connecticut Comprehensive Wildlife Conservation Strategy

J: 2012 Terrestrial and Wetland Representative Species of the North Atlantic: Species Selected, Considered, and Associated Habitats (Ecological Systems). These species were LCC candidate species and are represented by the selected LCC Representative Species.

4 - CCP Objectives from Silvio O. Conte NFWR Comprehensive Conservation Plan, Chapter 4, Service - preferred Alternative.

5 - These habitat types are based on the North Atlantic Landscape Conservation Cooperative (NALCC) habitat groupings for associated Representative Species, which were derived from The Northeastern Terrestrial Habitat Classification System (NETHCS). See table A.52 for a comparison of the NALCC habitat groupings and NETHCS.

BOLD - These species are LCC Representative Species, which is a species that, because of its habitat use, ecosystem function, or management response, typifies lifecycle or habitat requirements for a larger group of species.

* The Refuge Improvement Act directs the US Fish and Wildlife Service to maintain Biological Integrity, Diversity, and Environmental Health (BIDEH). Elements of BIDEH are represented by native fish, wildlife, plants and their habitats as well as those ecological processes that support them.

Objectives and Strategies for Refuge Lands in the Pyquag CFA under Alternative C

Goal 1: Wildlife and Habitat Conservation: Promote the biological diversity, integrity, and resiliency of terrestrial and aquatic ecosystems within the Connecticut River watershed in an amount and distribution that sustains ecological function and supports healthy populations of native fish, wildlife, and plants, especially Federal trust species of conservation concern, in anticipation of the effects of climate, land use, and demographic changes.

Objective 1.1: Forested Uplands and Wetlands

Sub-objective 1.1a. (Hardwood Forest)

Improve the diversity of seral stages and (where and when possible) restore historic composition and structure, and improve landscape connectivity of hardwood forest habitat to support species of conservation concern and aid in climate change adaptation. Management will provide stopover habitat for spring and fall migrants.

Rationale:

We envision healthy forests within the Pyquag CFA where a diverse seral structure provides suitable habitat conditions for a suite of Connecticut wildlife. Our long-term vision for the CFA includes hardwood forests characterized by complex horizontal and vertical structure, a generally closed canopy, large-diameter trees, dead woody material, snags and cavity trees, native species diversity, softwood inclusions, and a diversity of wildlife (Foster et al. 1996, Goodburn and Lorimer 1998, Keeton 2006, D'Amato et al. 2009, Curzon and Keeton 2010).

Pyquag CFA hardwood forests are diverse and productive for wildlife, and abundant, high-quality habitat is certainly available within the CFA. To date our review of the Pyquag CFA habitats and wildlife species—and their condition—has been limited to coarse-scale information: the careful analysis of spatially-explicit habitat data using GIS, the consultation of local, state, and regional species conservation plans, and an understanding of forest disturbance and land-use history in New England. This allowed identification of broad habitat types, and species of conservation concern known to utilize characteristics common to these habitats. Our understanding of the forest structure within Pyquag comes exclusively from a reading of forest history in New England—a legacy of intensive past-use that altered the vegetation structure and composition, landscape patterns, and ongoing ecological dynamics (Cronon 1983, Whitney 1996, Foster et al. 1997, Bellemare et al. 2002, Hall et al. 2002). Our sub-objective assumes the forests of the Pyquag are more homogeneous than those of three centuries earlier, and include more sprouting and shade-intolerant species and fewer long-lived mature forest tree species (Goodburn and Lorimer 1998, Foster et al. 1998, Foster 2000, Bellemare et al. 2002, Cogbill et al. 2002, Abrams 2003). Completing a comprehensive forest and habitat inventory post-acquisition will test these assumptions, and aid in identifying stands where a forest management approach that combines passive management and the application of silvicultural treatments designed to emulate gap dynamics, will promote compositional and structural diversity, and where appropriate, move succession forward to emulate later seral stage characteristics.

Migrating landbirds are typically unable to deposit sufficient fat stores to fly nonstop between breeding and nonbreeding areas (Blem 1980) and must use stopover habitats for feeding and resting before continuing migration. Studies have shown migrating birds exhibit selective use of some habitats over others (Moore et al. 1990, Petit 2000, Rodewald et al. 2004). In general, taller, more structurally diverse vegetation types within an area appear to support greater numbers of migrating birds than do habitats of lower stature and complexity (Moore et al. 1990, Noss 1991). Clearly, structurally complex habitats will not be suitable for all migratory species, but our conservation goal is to provide those areas used most frequently by migrating birds, suggesting relatively tall, structurally diverse habitats may best serve this purpose. The plasticity in habitat use exhibited by most species during migration (Moore et al. 1990, Petit 2000) suggests that many species are able to effectively use the food resources and cover afforded by structurally complex habitats. While our management goals may create a relatively old forest, hardwood forests within Pyquag will contain a variety of patches in different age classes and developmental stages; it is not uniform throughout. This diversity of age classes provides a variety of bird species with a range of foraging opportunities. Patches of mature edge-dominated (i.e. forest-agricultural edge

and suburban forest of the type within Pyquag) and shrub-sapling stage forests were used most frequently by fall stopover migrants in a Pennsylvania study (Rodewald et al. 2004).

In a mature forest, many migrating bird species tend to remain within specific vegetation layers: on or near the ground, in the middle layer, or up in the canopy. Hardwood forests within Pyquag should have all forest layers present in moderate to high amounts distributed throughout a stand and across the landscape. Enhanced vertical structure will provide the greatest number of bird species with the greatest number of foraging opportunities. Our active forest management efforts will aim to create or maintain a canopy that is generally closed (greater than 75 to 80 percent closure) with small gap openings scattered throughout a stand and the CFA. These openings will be caused by or mimic small, single- to few-tree disturbances and create opportunities for regenerating intermediate- and shade-tolerant species. Regeneration in these openings will provide a continual supply of ephemeral shrub-sapling habitat rich in fruits and insects important to migrating birds (Noss 1991, DeGraaf et al. 2006). Efforts to regenerate a diversity of species must contend with evidence of reduced diversity or damage to tree seedlings and herbaceous plants attributed to white-tailed deer (Hough 1965, Anderson and Loucks 1979, Tilghman 1989, Rooney et al. 2004, Côté et al. 2004, see also Rawinski 2008).

Implementation of refuge strategies will begin with a comprehensive, multi-scale forest and wildlife habitat inventory. Forest wildlife species survival and breeding success is dependent not only on the habitat at the stand level, but also the surrounding landscape, making it necessary to consider the proportions and sizes of stand types and successional stages within the CFA and the associated landscape. Baseline information on the condition of hardwood forests at the time of acquisition will further inform more detailed, stand-level habitat prescriptions within a required step-down HMP.

Management Strategies:

Within 5 years of land acquisition and CCP approval:

- Identify forest stands with late successional characteristics for passive management, and those where active management is necessary to improve forest structure. Appendix J provides general forest management guidelines, including descriptions of forestry techniques and explanations about how we will determine where and how to conduct active management.
- Work with partners, including the State of Connecticut, in support of the State Wildlife Action Plan, to ensure management on Service lands complement adjacent land management objectives.

Within 10 years of land acquisition and CCP approval:

- Implement identified active forest management opportunities using accepted silvicultural practices. Appendix J provides general forest management guidelines, including descriptions of forestry techniques and explanations about how we will determine where and how to conduct active management.
- Protect hard and soft mast producing species such as American beech inclusions, and apple and cherry trees, through the use of best management practices.
- Ensure a diversity of native species is present and non-native species are excluded or managed to keep population levels as low as possible.
- Explore research opportunities with academic partners to address efficacy of forest management in meeting wildlife objectives.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Conduct forest and wildlife inventories.
- Map natural communities; protect rare or exemplary examples.
- Map vernal pools and seeps.

Sub-objective 1.1a. (Hardwood Swamp)

Improve the diversity of seral stages, (where and when possible) restore historic composition and structure, and improve the natural hydrology to support natural and rare ecological communities. Management will provide stopover habitat for spring and fall migrants.

Rationale:

Occurrences of hardwood swamps within the Pyquag Conservation Focus Area (CFA) represent a number of natural communities. Historically they have undergone significant alteration, and have great potential for restoration. Acidic hardwood swamps may be found in basins, or on gently sloping seepage lowlands within small patches where an acidic substrate of mineral soil, often with a component of organic muck, creates a shallow, perched water table. Eastern hemlock is often the dominant overstory species, and the organic substrate supports an important sphagnum (moss) layer.

Hardwood swamp occurrences within Pyquag with more alkaline soils are often found along riparian and floodplain areas in small patches where soils have an impermeable or nearly impermeable clay layer that can create a shallow, perched water table. Saturation can vary, with ponding of water common during wetter seasons and drought during the summer or autumn months. The dynamic nature of the water table drives complexes of forest upland and wetland species including pin oak, red maple, swamp white oak, sweetgum, and blackgum. The examples identified within the Pyquag CFA occur within the floodplain of the Connecticut River.

These two systems do share a common disturbance history; agricultural practices, development pressures, and selective logging have largely removed these habitats from the landscape, or greatly simplified their historic species composition. Changes in hydrology, water pollution, invasive species introductions, and soil compaction remain as threats. Successional trends in hardwood swamps are not well understood. Our conservation efforts within the Pyquag will focus on promoting the ecological integrity of these stands through restoration of degraded floodplains, and (where and when possible) restoring composition and structure to accepted historical conditions. Restoration of the primary natural disturbance mechanism (seasonal flooding) will aide in the restoration of historical species mixtures.

Restoration of forest habitats, natural levees, backwater sloughs, and oxbow lakes will create high-quality habitat for spring and fall migrant birds in an otherwise agricultural landscape where small, disturbed forest fragments are the rule. Closed canopy deciduous forests that include pin oak and other hardwoods provide mast and other foraging sites shown to be important during the energy-intensive migration (Petit 2000).

Implementation of refuge strategies will begin with a comprehensive, multi-scale forest and wildlife habitat inventory. Forest wildlife species survival and breeding success is dependent not only on the habitat at the stand level, but also the surrounding landscape, making it necessary to consider the proportions and sizes of stand types and successional stages within the CFA and the associated landscape. Baseline information on the condition of hardwood swamps at the time of acquisition will further inform more detailed, stand-level habitat prescriptions within a required step-down Habitat Management Plan.

Management Strategies:

Within 5 years of land acquisition and CCP approval:

- Work with partners, including the State of Connecticut in support of the State Wildlife Action Plan, to ensure management on Service lands complement adjacent land management.
- Evaluate hydrologic regime to inform restoration efforts.
- Identify forest stands where management is necessary to improve species composition. Appendix J provides general forest management guidelines, including descriptions of forestry techniques and explanations about how we will determine where and how to conduct active management.

Within 10 years of land acquisition and CCP approval:

- Implement identified forest management opportunities to improve species composition. Appendix J provides general forest management guidelines, including descriptions of forestry techniques and explanations about how we will determine where and how to conduct active management.
- Explore research opportunities with academic partners to address efficacy of forest management in meeting wildlife objectives.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Map vernal pools and seeps.

- Conduct forest and wildlife inventories.
- Map natural communities; protect rare or exemplary examples.

Sub-objective 1.1c. (Shrub Swamps and Floodplain Forest)

Manage shrub swamp and floodplain forest communities to support natural and rare ecological communities, and provide breeding, foraging and stopover habitat for priority refuge resources of concern including American black duck.

Rationale:

Shrub swamps are restricted to poorly drained areas, small seepage zones, and wide alluvial stretches of rivers and small streams. Shrubs tend to dominate the wetland, though grasses may be present. Typical species include willow, silky dogwood, speckled alder, white meadowsweet, bluejoint, tall sedge, and common rush. Our coarse-scale habitat analysis of this CFA identifies a wetland complex in South Wethersfield on the west side of the Connecticut River with a high percent of freshwater marsh interspersed with small pockets of shrub swamp. Please see sub-objective 1.2a for a detailed discussion on this wetland complex, freshwater marsh communities, and priority resource of concern.

Management Strategies:

Within 5 years of land acquisition and CCP approval:

- Minimize refuge activities that disturb wetland communities.
- Work with partners, including the State, in support of the State Wildlife Action Plan, to ensure management on Service lands complement adjacent land management objectives.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Survey wildlife utilization of existing wetlands.
- Map natural communities; protect rare or exemplary examples.

Objective 1.2: Non-forested Uplands and Wetlands

Sub-objective 1.2a. (Freshwater Marsh)

Manage freshwater marsh communities to support natural and rare ecological communities, and provide breeding, wintering and stopover habitat for priority refuge resources of concern including American black duck.

Rationale:

The freshwater marsh habitat within the Pyquag CFA occurs in past channels of the Connecticut River. These marshlands are within the active floodplain, and may be influenced by the tide. The largest contiguous acreage occurs in South Wethersfield on the east side of Interstate 91. It is part of a larger wetland complex that may provide breeding, foraging, and wintering habitat for American black duck, a species of conservation concern, as well as migratory stopover habitat for a variety of other waterfowl species. These freshwater marshes also provide important habitat for American bittern, sora rails, and least bittern. Two state plant species of special concern, green dragon and golden club also occur in the Pyquag CFA wetland habitats.

Flooding of this wetland complex during high water events provides a diversity of plant communities, and habitats for a variety of wildlife species. American black duck is a species of concern in the North American Waterfowl Management Plan because of historic population declines, and is listed as highest priority for conservation in BCR 30. Black ducks use wetlands, including shrub swamp and freshwater marsh communities, as stopover habitat during migration, and as breeding and wintering habitat. Well-concealed nests are placed on the ground in nearby uplands or hummocks in wetlands, and adults and their broods forage on seeds, aquatic vegetation, and invertebrates (Longcore et al. 2000, DeGraaf and Yamasaki 2001). Open water habitat and the adjacent wetland complex provides excellent wintering and migrating habitat for American black ducks. And located on the Connecticut River, an important migration corridor, these wetland communities are used by other waterfowl species during migration including green-winged teal, common merganser, mallards, bufflehead and wood ducks.

The wetland complex is surrounded by development and agricultural land. Impacts may include altered hydrology, contamination, and non-native invasive plant species. A multi-scale wildlife habitat inventory will be necessary to determine the condition of all habitats in the CFA. This baseline information will further inform more detailed habitat prescriptions within a required step-down HMP.

Management Strategies:

Within 5 years of land acquisition and CCP approval:

- Minimize refuge activities that disturb wetland communities.
- Encourage local landowners to use Connecticut Best Management Practices within active agricultural fields that are located along the perimeter of marsh habitats.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Survey wildlife use of existing wetlands.
- Inventory wetland plant communities, and evaluate wetland hydrology for potential impacts to the natural flow regimes.
- Map natural communities; protect rare or exemplary examples.

Sub-objective 1.2b. (Pasture/Hay/Grassland)

Where appropriate, restore historic composition and structure, and improve the natural hydrology and landscape connectivity to support natural and rare ecological communities. Management will provide stopover habitat for migratory species.

Rationale:

Thirty percent of the Pyquag CFA is typed as pasture, hay, and grassland habitat. The majority of these habitats is in active agricultural use, and is located in floodplain of the Connecticut River. This large floodplain includes Keeny and Wethersfield Coves, and extends approximately 5 miles south along the winding Connecticut River. It is 4 to 5 feet above the normal river level, and annual spring floods generally rise 10 to 15 feet above, flooding approximately 2,740 acres. This floodplain is a natural flood storage area for the surrounding communities, and remnant patches are ranked as exemplary by the Connecticut Natural Heritage Program.

The topography and natural processes of floodplain systems result in the development of complex upland and wetland vegetation on generally flat topography, and soils deposited by the river. The Pyquag CFA has this diversity of habitats in areas not cleared for agricultural use. Hardwood forests and swamps, shrub swamps, and freshwater marsh are part of the floodplain. Silver maple is a characteristic species of a floodplain forest, as well as red maple, ash, red oak, and yellow birch. Common shrubs include black willow, silky dogwood and viburnums. The herbaceous layer within the forested portions of the floodplain, include spring ephemerals and ferns (Gawler 2008).

Restoration of this floodplain will provide a more contiguous and diverse breeding and migratory habitat for a variety of wildlife species. The Pyquag CFA is significant migration habitat as it straddles the Connecticut River, an important migratory corridor. A restored floodplain will also improve its function to retain and slow flood waters, reducing the extent of damage to the surrounding communities, and thereby improving water quality.

However, we also support the protection of high-value, productive agricultural lands identified by local communities and the State. It is not the refuge's intention to target these lands for acquisition. Instead, our priority would be to work with individual landowners, states, and other Federal agencies to protect these lands and ensure they continue to be part of the working landscape. There are many State and Federal programs that protect agricultural lands and help promote farming practices that benefit wildlife and help protect water quality. Through our private lands program, we will help direct landowners who are interested in these programs to the proper state and Federal agencies and programs. In rare cases, we may acquire agricultural lands from willing sellers, when other options to keep the land in agricultural production are not available, or if habitats for Federal trust resources are in jeopardy from development or other land use changes.

Management Strategies:

Within 5 years of land acquisition and CCP approval:

- Work with partners and landowners to promote farming practices that benefit wildlife and protect water quality.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- As new pasture, hay, and/or grassland habitat is acquired, evaluate its ecological importance to determine if it should be maintained or if it should be restored to native forest through tree plantings or natural succession.

Objective 1.3: Inland Aquatic Habitats

Sub-objective 1.3a. (Open Water)

In collaboration with partners, identify and implement habitat restoration opportunities within the Pyquag CFA and Connecticut River to benefit priority refuge resources of concern including American shad, shortnose sturgeon, American eel, alewife, blueback herring, and Atlantic salmon, as well as other species of conservation concern such as sea lamprey.

Rationale:

The Pyquag CFA straddles the Connecticut River which provides important habitat for American shad, shortnose sturgeon, American eel, alewife blueback herring and Atlantic salmon. Keeney and Wethersfield Coves, located in past river channels, and Crow Point (a borrow pit for I-91) are accessible from the Connecticut River and provide additional open water habitat for these species. It is important, therefore, to maintain open channels to these coves for aquatic species passage. There are also various brooks that feed into the Connecticut River and Coves that are important for river herring. The Connecticut River is important migratory habitat for Atlantic salmon, American shad, and shortnose sturgeon (a federally listed species), and spawning habitat for river herring. This area of the Connecticut River is also important as overwintering habitat for shortnose sturgeon. American eel, a species petitioned for federal listing, also occurs in the freshwater systems of this CFA. American eel enter the Connecticut River as juveniles, and migrate upstream to inhabit bays, estuaries, streams, lakes, and ponds. Eels feed in these aquatic habitats until they reach sexual maturity and begin the long migration to their spawning grounds in the Sargasso Sea (ASMFC 2000).

Another species of conservation concern that utilize freshwater aquatic habitats in this CFA is sea lamprey. Sea lamprey enter the Connecticut River and tributaries to reproduce, and in the process provide important ecological benefits to aquatic systems. Adults transport nutrients between freshwater and saltwater systems, their nest construction restores and enhances streambed structure, abandoned nests are used by other riverine fish, and lamprey eggs and larvae provide food for a variety of species (Kircheis 2004). As with many riverine fish, sea lamprey movement is impeded by barriers on the main stem and tributaries.

Restoring and maintaining the ecological integrity of upland and wetland habitats of the CFA will have positive impacts on water quality of the Connecticut River, and other aquatic systems in the CFA. Baseline information on the condition of the water resources, and associated upland and wetland habitats in the CFA will further inform more detailed habitat prescriptions within a required step-down HMP.

Management Strategies:

Within 5 years of land acquisition and CCP approval:

- Work with partners to maintain open channels from the Connecticut River to open water coves.
- Work with adjacent landowners to eliminate barriers to aquatic species passage.

Within 10 years of land acquisition and CCP approval:

- Work with partners to protect and increase “hard bottom” (e.g., gravel, cobble, or bedrock) substrate for spawning aquatic species.
- Work with partners to reduce combined sewer overflow.

Objective 1.4: Coastal Non-forested Uplands (coastal beaches and rocky shores)

Not applicable

Objective 1.5: Coastal Wetlands and Aquatic Habitats (tidal salt marsh and estuary)

Not applicable

Goal 2: Education, Interpretation, and Outreach: Inspire residents and visitors to actively participate in the conservation and stewardship of the exceptional natural and cultural resources in the Connecticut River watershed, and promote a greater understanding and appreciation of the role of the Silvio O. Conte National Fish and Wildlife Refuge in conserving those resources.

Objective 2.1: Environmental Education

In collaboration with public and private educators from all four states in the watershed, lead or facilitate the implementation of structured natural and cultural resource curricula, with a focus on guiding educators and students to develop an awareness of, and concern about, natural and cultural resources and associated challenges; appreciate our conservation history; make informed decisions and work individually or collectively toward solutions; and model responsible environmental stewardship in their everyday lives.

Sub-objective 2.1a. (Environmental Education Planning and Training)

Encourage schools, scout groups, and summer camps to develop curricula that use the Pyquag Division as an outdoor classroom.

Rationale:

See environmental education rationale in chapter 4 detailing the importance of environmental education for the Service. Environmental education is one of the six priority, wildlife-dependent recreational uses of the Refuge System. Environmental education is particularly important at Conte Refuge because one of its founding purposes is to provide opportunities for environmental education. Environmental education is an important tool that can help refuge visitors and local residents, particularly students, appreciate the importance of this area to the larger watershed.

Management Strategies:

Within 1 year of acquiring sufficient land:

- Encourage schools, scout groups, and summer camps to develop curricula that use the Pyquag Division as an outdoor classroom.

Sub-objective 2.1b. (Environmental Education Delivery)

Encourage schools, scout groups, and summer camps to use the Pyquag Division as an outdoor classroom.

Rationale:

Because this division will be unstaffed, the majority of environmental education opportunities on this division will be led by partners, volunteers, and local school groups and other educational groups (e.g., scout groups and summer camps).

Management Strategies:

Within 1 year of acquiring sufficient land:

- Encourage schools, scout groups, and summer camps to develop curricula that use the Pyquag Division as an outdoor classroom.

Objective 2.2: Interpretation

Develop, lead, and facilitate interpretive programs that emotionally and intellectually connect the audience to natural and cultural resources in the watershed.

Sub-objective 2.2a. (Natural and Cultural Resource Interpretive Planning and Training)

With Friends groups, public and non-profit organizations, and volunteers, offer quality interpretive programming at the Pyquag Division. The development of highly trained interpreters will be encouraged by offering interpretive training to Friends' members, partners, and volunteers on a regular basis.

Rationale:

See the rationale in chapter 4 detailing the importance of interpretation for the Service. Interpretation is an important tool that can help refuge visitors and local residents appreciate the importance of this area to the larger watershed. With an ADA compliant trail planned for the site, the Pyquag Division will be well suited to support both self-guided, wildlife dependent interpretive experiences, as well as guided interpretive programs that convey messages about the refuge and about the Pyquag Division's habitats and cultural resources.

Management Strategies:

(These strategies are dependent on land acquisition from willing landowners.)

Within 5 years of acquiring sufficient land:

- Inventory and evaluate each CFA to determine the appropriate interpretive materials to employ.
- Create meaningful, consistent, thematic statements to be used in the delivery of programming at the Pyquag Division.
- Provide resources and trainings to Friends, and volunteers in support of interpretive programs.

Within 10 years of acquiring sufficient land:

- Develop standardized self-guided interpretive services, such as interpretive trails and kiosks, exhibits, and printed media.
- Employ a variety of themed interpretive offerings (e.g., presentations, audio-visual programs, brochures, and exhibits) when creating programming for natural and cultural resource interpretation.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

Build an evaluation process that includes formal and informal evaluation to assess the effectiveness of all interpretation programs.

Sub-objective 2.2b. (Natural and Cultural Resource Interpretive Program Delivery)

Collaborate with Friends group, partners, and volunteers to deliver quality natural and cultural resource interpretive programs.

Rationale:

See rationale for sub-objective 2.2a.

Management Strategies:

(These strategies are dependent on land acquisition from willing landowners.)

Within 5 years of acquiring sufficient land:

- Through partners, and Friends group, annually provide quality interpretive programs, exhibits, printed media at the Pyquag Division.
- Incorporate thematic statements, measureable objectives, and evaluation measures into all interpretation efforts.
- Publicize interpretive programs through traditional media, on the refuge web site, and digital social media conduits.

- Maintain a supply of print interpretive brochures, i.e., general brochure and bird checklist that incorporate refuge interpretive messages and themes.
- Work with partners to create issue-oriented experiential activities and programs for use at their facilities.

Within 10 years of acquiring sufficient land:

- Contribute refuge interpretive information for scenic byways and other state publications and signs.
- Develop self-guided interpretive messages and use state of the art as well as traditional media (e.g., brochures).

Objective 2.3: Public and Community Outreach

Support, promote, and coordinate a wide range of outreach tools and activities to facilitate and improve communications and relationships with the American public, especially communities, adjacent landowners, and elected officials in the Connecticut River watershed, and to empower citizens to recognize and resolve local natural resource issues and promote conservation and the responsible use of natural resources.

Because the Pyquag Division would be unstaffed and does not have refuge facilities, public and community outreach for this site will occur through regular outreach activities at the headquarters and will not specifically occur at this site.

Objective 2.4: Science and Technical Outreach

Facilitate the collection and exchange of information that increases the knowledge and understanding of natural and cultural resources, addresses climate change and other conservation issues, and provides land managers with better information to make management decisions affecting resources.

Because the Pyquag Division would be unstaffed and does not have refuge facilities, science and technical outreach for this site will occur through regular outreach activities at the headquarters and will not specifically occur at this site.

Goal 3: Recreation: Promote high-quality, public recreational opportunities in the Connecticut River watershed that are complementary between ownerships and provide regional linkages with emphasis on promoting wildlife-dependent activities that connect people with nature.

Objective 3.1: Hunting

Support quality public hunting opportunities in the Connecticut River watershed to promote a unique understanding and appreciation of natural resources and their management on lands and waters, while also protecting a traditional outdoor pastime deeply rooted in America's natural heritage and conservation history.

Sub-objective 3.1a. (Hunting Opportunity, Access, and Infrastructure)

Provide the opportunity for a quality hunting experience based on state regulations.

Rationale:

Hunting is allowed on national wildlife refuges, consistent with the final compatibility determination. The Pyquag CFA is comprised of floodplain forests and wetlands adjacent to the Connecticut River, offering good hunting opportunities for waterfowl, small game, and white-tailed deer. A public hunting area in close proximity to Hartford would be popular and would help the refuge connect with the sporting community. Hunting, if found to be a compatible use, will be allowed when the Service acquires land that can support hunt seasons. Retaining

hunting opportunities on public lands will ensure this wildlife-dependent recreational activity continues and contribute to the state's population management objectives.

Management Strategies:

(These strategies are dependent on land acquisition from willing landowners and determination that hunting is a compatible use.)

Within 1 year of acquiring sufficient land to support hunting seasons:

- Complete all administrative requirements to officially open to hunting consistent with State hunting regulations and, if necessary, additional refuge-specific regulations.
- Allow hunters access to the refuge outside of the normal division open hours (i.e. 30 minutes before sunrise and 30 minutes after sunset) as long as they are engaged in lawful hunting activities.
- Consult with Connecticut Department of Energy and Environmental Protection, Hunting Review Team in evaluating the suitability of new acquisitions to support a safe, manageable hunt program.
- Post newly acquired properties to ensure refuge boundary lines are clearly marked.
- Open newly acquired lands to hunting, if found to be compatible.
- Install an informational kiosk in a conspicuous location to post information on hunting seasons and other notices to visitors.

Within 5 years of acquiring land sufficient land to support hunting seasons:

- Work with Connecticut Department of Energy and Environmental Protection to determine whether opportunities exist for state-recognized disabled hunters.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Work with Connecticut Department of Energy and Environmental Protection to evaluate the effectiveness and success of the refuge hunt program in contributing to state population objectives.

Sub-objective 3.1b. (Hunter Education and Outreach)

Provide hunter education classes access to the division and conduct directed outreach to ensure hunters are informed about regulations, hunter ethics, and safety considerations. Develop programs, including brochures, signage, website pages, media releases, etc. to increase interest in hunting at the division.

Rationale:

Hunting is a priority public use that also serves as a population management tool. Providing hunter education instructors the opportunity to use the division with their classes will strengthen connections to the hunting community and student understanding of the role hunting plays in wildlife management. Making relevant information readily available to hunters through a variety of media will improve the quality of the hunting experience.

Management Strategies:

(These strategies are dependent on land acquisition from willing landowners and determination that hunting is a compatible use.)

Within 1 year of acquiring land sufficient land to support hunting seasons:

- Produce a hunt brochure that includes a hunt map and information on regulations, hunter ethics, safety considerations, etc. and make it available on the refuge website, at Pyquag Division kiosks, through a friends group, and in local businesses.
- Provide visitors with general information on the hunting program and refuge-specific and State regulations through the refuge website, information signs, and a hunting brochure. In all materials related to the hunting program, promote and encourage the use of lead-free ammunition.
- Work with the State to identify and evaluate the impacts associated with requiring the use of non-toxic ammunition for hunting on refuge lands.

Within 5 years of acquiring land sufficient land to support hunting seasons:

- Work with Connecticut Department of Energy and Environmental Protection to encourage youth hunting at the division as a means of introducing young people to this traditional recreation activity.
- Offer to host hunter education field courses.
- Develop a system to monitor and evaluate the hunting program with hunters and other users to determine if the objective is being met and to allow for adaptive management.

Objective 3.2: Fishing

Support quality, public fishing opportunities in the Connecticut River watershed to promote an understanding and appreciation of natural resources and their management on lands and waters, while also protecting a traditional outdoor pastime deeply rooted in the America's natural heritage and conservation history.

Sub-objective 3.2a. (Fishing Opportunities, Access, and Infrastructure)

Provide quality fishing opportunities at the Pyquag Division after completing all administrative procedures to officially open refuge lands to fishing, based on Connecticut Department of Energy and Environmental Protection regulations.

Rationale:

Fishing would be allowed on a newly created division consistent with the final compatibility determination. The principal fishing resource on this CFA is the Connecticut River; although three small streams (i.e. Beaver Brook, Salmon Brook, and Hubbard Brook) flow through sections of the CFA. Most people fish the Connecticut River from boats, but allowing bank fishing on a Pyquag Division would provide the public with another recreational opportunity. Fishing is a popular activity throughout the river would continue under Service ownership. Retaining fishing opportunities conforms to historic use on CFA and much of the surrounding land in the area.

Management Strategies:

(These strategies are dependent on land acquisition from willing landowners and determination that fishing is a compatible use.)

Within 1 year of acquiring land with fishable waters:

- Complete all administrative requirements to officially open to fishing consistent with State hunting regulations and, if necessary, additional refuge-specific regulations.
- Post newly acquired properties to ensure refuge boundary lines are clearly marked.
- Install an informational kiosk in a conspicuous location to post information on fishing seasons and other notices to visitors.
- The Pyquag Division would be open to visitors actively engaged in fishing during the seasons and times established by the state in their annual fishing regulations.

Within 5 years of acquiring land with fishable waters:

- Work with the Connecticut Department of Energy and Environmental Protection to inventory and assess fish populations on the division.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Develop a system to monitor and evaluate the fishing program with anglers and other users to determine the objective is being met and to allow for adaptive management.

Sub-objective 3.2b. (Angler Education and Outreach)

Develop programs, including brochures, signage, website pages, media releases, etc. to inform visitors of fishing opportunities at the division.

Rationale:

Fishing is a priority public use and a traditional use in the CFA. If land is acquired, the refuge will make information readily available to interested anglers regarding opportunities to fish on Service-owned land, location of fishable waters, and the available game fish.

Management Strategies:

(These strategies are dependent on land acquisition from willing landowners and determination that fishing is a compatible use.)

Within 1 year of acquiring land with fishable waters:

Produce a fishing brochure that includes information on regulations, angler ethics, safety considerations, etc. and make it available on the refuge website, at informational kiosks, and in local businesses. In all materials related to the fishing program, promote use of lead-free tackle.

Objective 3.3: Wildlife Observation and Photography

Support quality, public opportunities to observe and photograph wildlife in the Connecticut River watershed in a variety of natural habitats to connect a broad spectrum of people with nature.

Sub-objective 3.3a. (Infrastructure and Access for Wildlife Observation and Photography)

Provide quality opportunities for wildlife observation and photography for people of all physical abilities.

Rationale:

Wildlife viewing and photography is a priority public use on national wildlife refuges and a popular recreational activity. Opening acquired land in this new division to wildlife observation and photography will provide visitors a chance to see and photograph a variety of wildlife species in their native habitats, while learning more about the Service, Refuge System, and the refuge.

Management Strategies:

(These strategies are dependent on land acquisition from willing landowners and determination that these uses are compatible.)

Within 1 year of acquiring land:

- Consistent with the final compatibility determination, allow public access from 30 minutes before sunrise to 30 minutes after sunset with the exception listed for hunters and anglers.
- Install an informational kiosk in a conspicuous location to post information on wildlife observation and photography opportunities, and other notices to visitors.

Within 5 years of acquiring land:

- Develop a public access strategy and required planning (i.e. NEPA, compatibility determination) that includes consideration of developed trails, parking, kiosks, viewing platforms, blinds, interpretation, signage, etc.

Within 15 years of acquiring land:

- Implement the visitor use enhancements identified in the public access strategy and the refuge Visitor Services Plan.

Sub-objective 3.3b. (Wildlife Observation and Photography Aids)

Offer viewing and photography aids that enhance the visitor experience. Use a variety of methods to reach a broad spectrum of people. Work closely with a friends group and other partners that host events designed to view wildlife on the division.

Rationale:

The entire division would be available for wildlife observation and photography; however, there are steps the refuge can take to enhance the experience. By providing new visitors a quality experience they are more likely to return and share their experiences with others. One way to accomplish this is to offer sufficient information to attract a variety of visitors through a variety of media.

Management Strategies:

(These strategies are dependent on land acquisition from willing landowners and determination that these uses are compatible.)

Within 1 year of acquiring land:

Allow photography blinds that do not negatively impact wildlife behavior or conflict with other visitors. Blinds must be removed each day, unless arrangements have been made via a special use permit.

Within 5 years of acquiring land:

- Develop interpretive panels for kiosks and trails that describe typical wildlife on the refuge, bird migration patterns, and other messages we want to convey to visitors.
- Sponsor wildlife observation events such as International Migratory Bird Day, the Big Sit, etc.
- Encourage local schools and groups and environmental organizations to offer wildlife-centered trips to the refuge.
- Produce a list of wildlife species and associated habitats and other conservation information on the division for distribution at informational kiosks, the refuge website, and other popular media.

Within 10 years of acquiring land:

- Develop a public access strategy and required NEPA documentation that includes consideration of developed trails, parking, kiosks, viewing platforms, blinds, interpretation, signage, etc.

Within 15 years of acquiring land:

- Implement the visitor use enhancements identified in the public access strategy and the refuge visitor services plan.

Sub-objective 3.3c. (Watershed-based Partner Initiatives)

Not applicable

Objective 3.4: Other Recreational Activities

In order to reach a broader demographic, support non-priority outdoor recreational opportunities and public access to quality, nature-based experiences throughout the Connecticut River watershed that facilitate and improve community relationships, raise awareness and an appreciation for conserving natural resources, and garner support for the National Wildlife Refuge System.

Sub-objective 3.4a. (Regional Water-based Trail Initiatives and Opportunities Including Refuge Lands)

Develop compatible opportunities on the Pyquag Division that support regional water-based trail initiatives to connect people with nature, raise the visibility of the Service and the Refuge System, make the refuge more relevant to the local community, and to promote economic activity in the local area.

Rationale:

Regional water-based trails give individuals opportunities to engage in outdoor recreational opportunities in the Connecticut River watershed, such as fishing, boating, and wildlife observation. Examples include the Connecticut River waterway route. Where appropriate, we will work with these partners to promote, and distribute information about, these opportunities.

Management Strategies:

Within 5 years of acquiring land:

- Work with public and private partners to determine whether and what roles this division might contribute to a Connecticut River waterway route.
- As lands are acquired, evaluate any water trails (e.g., canoe/kayak trails) that part of a regional or State network for their compatibility.

Sub-objective 3.4b. (Regional Land-based Trail Initiatives and Opportunities Including Refuge Lands)

Develop compatible opportunities on the Pyquag Division that support regional land-based trail initiatives to connect people with nature, raise the visibility of the Service and the Refuge System, make the refuge more relevant to the local community, and to promote economic activity in the local area.

Rationale:

Regional land-based trails give individuals opportunities to engage in outdoor recreational opportunities in the Connecticut River watershed, such as hiking, wildlife observation, and interpretation. Where appropriate, we will work with these partners to promote, and distribute information about, these opportunities.

Management Strategies:

Within 5 years of acquiring land:

As lands are acquired, evaluate any existing trails (e.g., hiking trails, snowmobile trails, horseback riding trails) that part of an established regional or State network to determine if they are appropriate and compatible uses for the refuge.

Sub-objective 3.4c. (Other Appropriate and Compatible Recreational Opportunities That Enhance Visitor Use and Enjoyment of Refuge Lands)

Allow compatible outdoor recreational opportunities on the Pyquag Division that connect people with nature, raise the visibility of the Service and the Refuge System, make the refuge more relevant to the local community, and promote economic activity in the local area.

Rationale:

In addition to the priority public uses, there are other wildlife-dependent, appropriate and compatible recreational activities that can broaden the visitor base, giving people alternative ways to enjoy the natural resources at the division without detrimentally impacting the wildlife resource.

Management Strategies:

(These strategies are dependent on land acquisition from willing landowners and determination these uses are appropriate and compatible.)

Within 1 year of acquiring land:

- Allow dispersed hiking, snowshoeing, and cross country skiing.
- Allow pet walking. In order to minimize conflicts with wildlife and other visitors, pets must be on leashes not longer than 10 feet in length.
- Allow recreational gathering of blueberries, blackberries, strawberries, raspberries, mushrooms, fiddleheads, and antler sheds.
- When compatible, allow commercial guiding in support of priority public uses by special use permit.
- Allow canoeing and kayaking in acquired coves and waterways.

Within 5 years of CCP approval:

Work with Friends groups and partners to design and market a virtual geocache course at the division. The course should integrate orienteering with refuge interpretive messages that include linking this division to other refuge divisions and units.

Overview Salmon Brook Conservation Focus Area (Proposed) Suffield, Granby, and East Granby, Connecticut

Conservation Focus Area (CFA)—Acreage Profile	Acres	Percentage of CFA
Total CFA Acres to be Conserved by Service	2,770	92.7 %
■ Existing Refuge Ownership in CFA ¹	0	
■ Additional Acres in CFA proposed for Refuge Acquisition ²	2,770	
Existing Acres in CFA Permanently Conserved by Others ^{2,3}	216	7.3 %
Total Acres in CFA ^{2,4}	2,986	100 %

¹Acres from Service's Realty program (surveyed acres); ²Acres calculated using GIS; ³The Service does not plan to acquire existing conserved lands, except under extenuating circumstances (conserved acres from TNC 2010 data); ⁴The Service would conserve up to this number of acres. The Service only acquires lands from willing sellers.

What specific criteria and/or considerations drove the selection of this CFA?

The proposed Salmon Brook CFA was identified by the State of Connecticut as a priority for grassland and early successional habitat restoration and management.

What are the priority habitat types within the proposed CFA? What percentage of the total CFA acreage do they represent?

- Hardwood Swamp – 17.8%
- Pasture/Hay/Grassland – 34.1%
- Shrub Swamp and Floodplain Forest – 1.7%

For more information on habitats in the CFA, see map A.10 and table A.8.

What are the resources of conservation concern for the proposed CFA?

As noted in table A.9 below, there are two priority refuge resources of concern (PRRC) aquatic species that rely upon the open water habitats in this CFA. There are also habitat types that are not being managed for a particular PRRC species, but are important for their contribution to Biological Integrity Diversity and Environmental Health (BIDEH) of the landscape. This includes potential for a large tract of contiguous grasslands to benefit declining grassland dependent species, and floodplain, a habitat that has undergone significant alteration within the Connecticut River watershed. The refuge will seek to protect and restore (if necessary) these, and other PRRC habitat types. Additionally, we recognize the value of this area to State Species of Greatest Conservation Need (SGCN) and migratory landbirds. These species and habitats are discussed further below.

1. Federal Threatened and Endangered Species

American eel, a species petitioned for federal listing, spend the majority of their young life in the freshwater systems of this CFA. American eel enter the Connecticut River as juveniles, and migrate upstream to inhabit bays, estuaries, streams, lakes, and ponds. Eels feed in these aquatic habitats until they reach sexual maturity and begin the long migration to their spawning grounds in the Sargasso Sea (ASMFC 2000).

2. Migratory Birds

The Connecticut River watershed is a major migration corridor. The lower portion of the watershed (CT and MA) receives higher use by migrants, with this use concentrated in habitats along the Connecticut River main stem. Migrants are also known to use habitats beyond the Connecticut River main stem within the watershed, though in lower numbers (Smith College 2006). The Salmon Brook CFA is less than 10 miles from the Connecticut River and contains large tracts of hardwood swamps and riparian habitat. These habitats provide stopover areas for a diversity of species including wood thrush, Canada warbler; black-throated blue warbler; black-throated green warbler; red-eyed vireo, American redstart, and yellow-bellied sapsucker (Smith College 2006).

3. Diadromous fish

The PRRC species for Salmon Brook CFA includes American eel, a species petitioned for federal listing, and brook trout. Mountain Brook, a tributary to the much larger Salmon Brook, meanders through the Salmon Brook CFA, providing habitat for brook trout and eel.

Over thirty-four percent of the Salmon Brook CFA is in pasture, hay and grassland habitat, consisting mostly of large fields between 50 to almost 200 acres. Management of these fields as grassland habitat would benefit declining grassland bird species. Grasslands are a high priority habitat for the state of Connecticut. These habitats provide breeding and nesting habitat for several state threatened and endangered species, including northern harrier, upland sandpiper, barn owl, and grasshopper sparrow. Grasshopper sparrow historically nested in the Salmon Brook CFA, one is of the few remaining nesting locations for this species in Connecticut (Comins personal communication 2013). Many grassland birds are area sensitive, and require large grassland acres (greater than 25 acres or 10 hectares) including grasshopper sparrows, bobolinks, eastern meadowlarks, and upland sandpiper (Vickery et al. 1994). A contiguous block of grassland habitat in the Salmon Brook CFA will benefit these species, and provide a habitat that is increasingly rare in the region.

4. Wetlands

Five-hundred and thirty acres of hardwood swamp and 51 acres of shrub-swamp and floodplain forest occur in the CFA. The majority of the acreage, and large contiguous patches, are adjacent and part of the Mountain Brook floodplain. Within the Connecticut River watershed agricultural practices and selective logging have largely removed floodplain habitat from the landscape, or greatly simplified its historic species composition. Floodplain habitat in the Salmon Brook CFA has undergone significant alteration and there is great potential for restoration. Intact floodplain forests in the Salmon Brook CFA will provide high-quality habitat for neo-tropical migratory birds, restore forest connectivity, and travel corridors for wildlife, and increase water quality and shade for aquatic species.

What habitat management activities would likely be a priority on refuge lands within the proposed CFA?

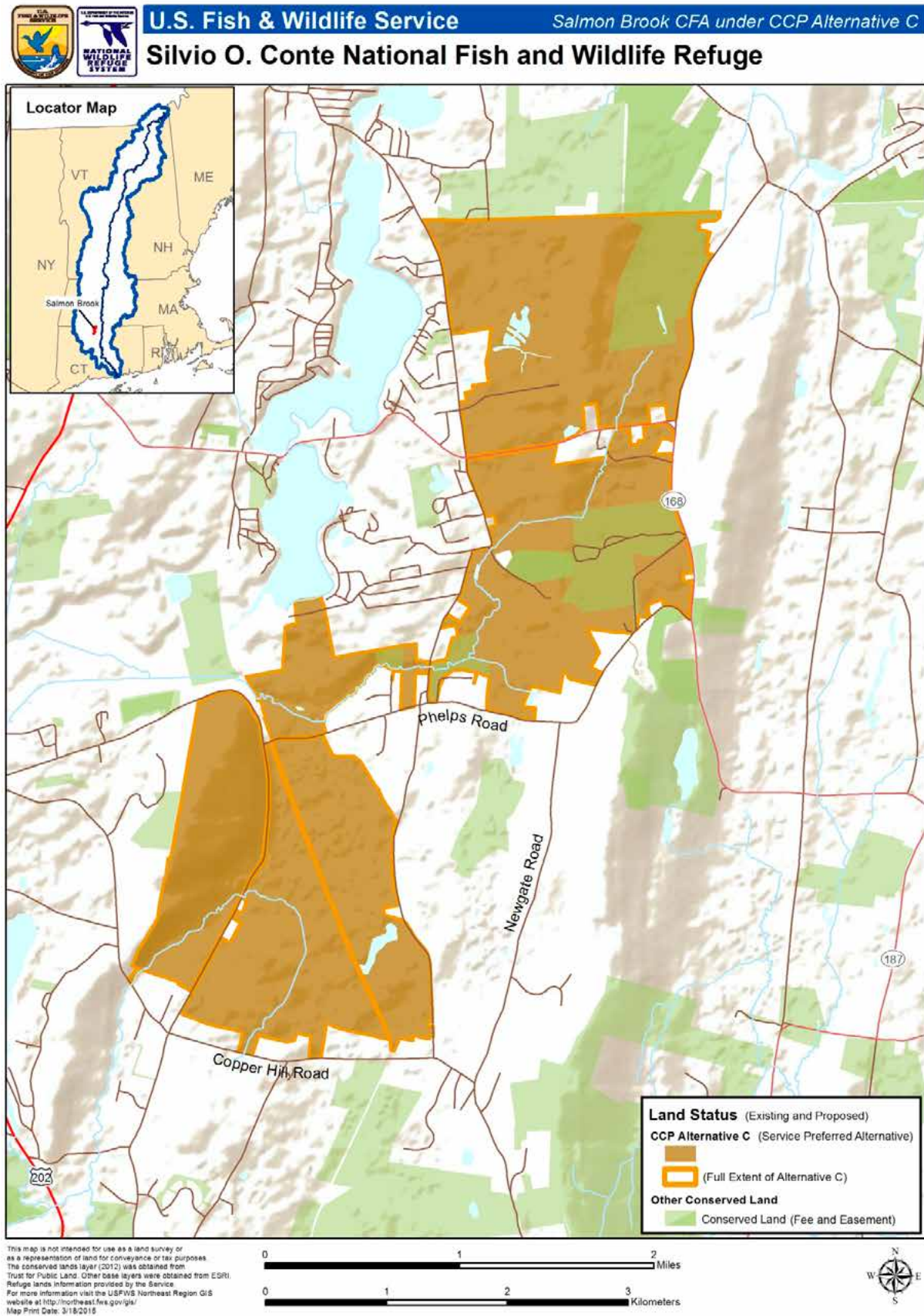
We will conduct a comprehensive, multi-scale wildlife habitat inventory following acquisition. Baseline information on the condition of habitats (ie. forested, non-forested and open water habitats) will further inform more detailed, habitat prescriptions within a required step-down Habitat Management Plan (HMP). Once inventory has been completed, then management will focus on maintaining the following conditions:

- Forest management activities will focus on restoration of degraded floodplains, including (where appropriate) restoring the primary natural disturbance mechanism (seasonal flooding) and species composition and structure to accepted historical conditions. Management of upland forests will improve structural diversity, and emphasize species appropriate for site conditions and location.
- Where appropriate, we will maintain large contiguous acres of warm season grasses.
- Our management activities in emergent and shrub wetland habitats will focus on maintaining the natural hydrology and native species composition. Invasive plant management will be a priority.
- In open water (stream, rivers, and ponds) habitats, we will focus on maintaining forested stream buffers, a structurally diverse instream habitat, and clear aquatic species passage to spawning and wintering habitat.

What public use opportunities would likely be a priority on refuge lands within the proposed CFA?

We would focus on providing opportunities for the six priority, wildlife-dependent recreational uses: hunting, fishing, wildlife observation and photography, environmental education, and interpretation.

Map A.9. Salmon Brook CFA – Location.



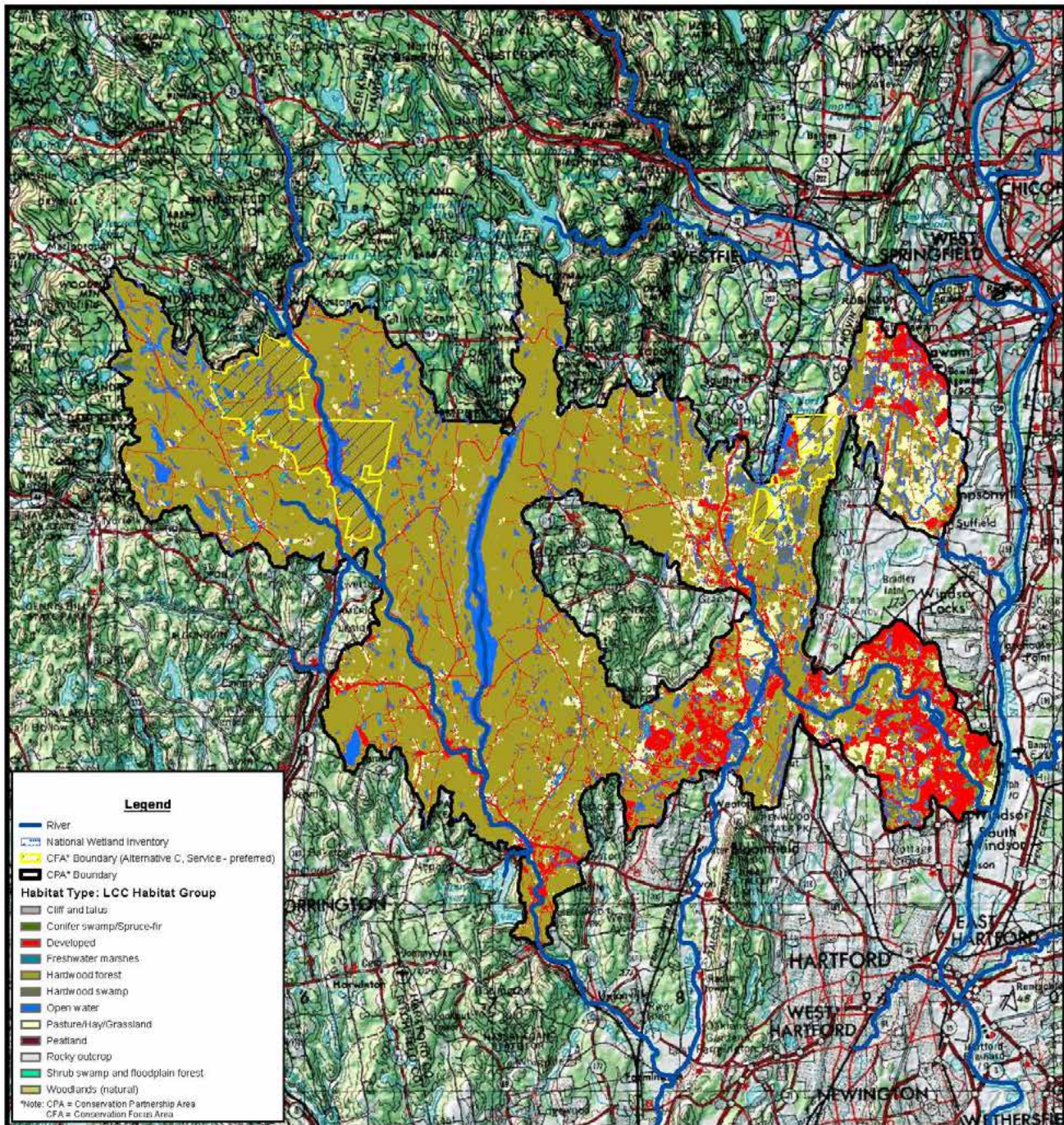
Map A.10. Farmington River CPA/Salmon Brook CFA – Habitat Types.



U.S. Fish & Wildlife Service

Habitat Types: Farmington River CPA* - MA

Silvio O. Conte National Fish and Wildlife Refuge



This map is designed for refuge management.
It is not intended for use as a land survey or
as a representation of land for conveyance or tax purposes.
For more information visit the USFWS Northeast Region GIS
website at <http://northeast.fws.gov/gis/>
Date: 7/2/2013

0 2 4 6 8
Miles



Table A.8. Farmington River CPA/Salmon Brook CFA – Habitat Types.

LCC General Habitat Type ¹	CPA ²		CFA ³			
	Total Acres	Percent of CPA ⁴	Total Acres	Conserved by Others ⁵	USFWS Owned ⁶	Percent CFA ⁷
Forested Uplands and Wetlands⁹						
Conifer swamp/spruce-fir	368	0.2%	0	0	0	0.0%
Hardwood forest	126,414	68.2%	1,271	132	0	42.7%
Hardwood swamp	8,355	4.5%	530	52	0	17.8%
Shrub swamp and floodplain forest	1,392	0.8%	51	8	0	1.7%
Woodlands (natural)	483	0.3%	9	0	0	0.3%
<i>Forested uplands and wetlands subtotal</i>	<i>137,013</i>	<i>73.9%</i>	<i>1,862</i>	<i>192</i>	<i>0</i>	<i>62.5%</i>
Non-forested Uplands and Wetlands⁹						
Cliff and talus	603	0.3%	4	0	0	0.1%
Freshwater marshes	804	0.4%	5	0	0	0.2%
Pasture/hay/grassland	16,907	9.1%	1,015	20	0	34.1%
Peatland	31	0.0%	0	0	0	0.0%
Rocky outcrop	25	0.0%	0	0	0	0.0%
<i>Non-forested uplands and wetlands subtotal</i>	<i>18,370</i>	<i>9.9%</i>	<i>1,023</i>	<i>20</i>	<i>0</i>	<i>34.3%</i>
Inland aquatic habitats⁹						
Open Water	6,498	3.5%	6	0	0	0.2%
<i>Inland aquatic habitats subtotal</i>	<i>6,498</i>	<i>3.5%</i>	<i>6</i>	<i>0</i>	<i>0</i>	<i>0.1%</i>
Other						
Developed	23,550	12.7%	89	3	0	3.0%
<i>Other subtotal</i>	<i>23,550</i>	<i>12.7%</i>	<i>89</i>	<i>3</i>	<i>0</i>	<i>3.0%</i>
TOTAL	185,430	100.0%	2,980	216	0	100.0%

**All acreages are based upon GIS analysis and should be considered estimates

1 - North Atlantic Landscape Conservation Collaborative general habitat typings for USFWS representative species; linked to the National Vegetation Classification System (NVCS). See table A.52 at the end of this appendix for a comparison of these generalized habitat types with the more specific The Nature Conservancy's Northeastern Terrestrial Habitat Classification System. More detailed habitat tables that include the Northeastern Terrestrial Habitat Classification System habitat types are available for each CFA and refuge unit online at: http://www.fws.gov/refuge/Silvio_O_Conte/what_we_do/conservation.html.

2 - Conservation Partnership Area

3 - Conservation Focus Area; representing Service - preferred Alternative C

4 - Percentage of the CPA represented by the habitat type

5- Acres in the CFA currently conserved by others (TNC 2012)

6 - Acres in the CFA currently owned by the USFWS

7 - Percentage of the CFA represented by the habitat type

8 - Percentage of a given habitat within the CPA protected within the CFA under Alternative C

9 - CCP Objective from Silvio O. Conte NFWR Draft CCP/EIS, Chapter 4, Alternative C-Service's Preferred Alternative

Table A.9. Salmon Brook CFA – Potential Priority Refuge Resources of Concern

Priority Refuge Resources of Concern ¹	Habitat Structure ²	Associated Species ³
Forested Uplands and Wetlands⁴		
Hardwood Forest⁵ - 1,271 acres		
<p>Appalachian (hemlock)-northern hardwood forest^H</p> <p>Northeastern interior dry-mesic oak forest^H</p> <p>Central Appalachian dry oak-pine forest^H</p>	<p>Northern hardwoods such as sugar maple, yellow birch, and American beech are characteristic of the <i>Appalachian (hemlock)-northern hardwood forest</i>, either forming a deciduous canopy or mixed with eastern hemlock (or in some cases white pine). Other common and sometimes dominant trees include Oak spp. (most commonly red oak, tulip poplar, black cherry, and black birch). <i>Northeastern interior dry-mesic oak forests</i> are typically closed-canopy forests, though there may be areas of patchy-canopy woodlands. Soils are acidic and relatively infertile but not strongly drought prone. Oak species characteristic of dry-mesic conditions (e.g., red oak, white oak, black oak, and scarlet oak and hickory are dominant in mature stands. Chestnut oak may be present but is generally less important than the other oak species. American chestnut was a prominent tree before chestnut blight eradicated it as a canopy constituent. Red maple, black birch, and yellow birch may be common associates. With a long history of human habitation, many of the forests are early in their development following disturbance, where White pine, Virginia pine, or tulip poplar may be a dominant or codominant presence. On hills and slopes within these forests, pockets with impeded drainage may support small isolated wetlands, including non-forested seeps or forested wetlands with red maple, swamp white oak, or black tupelo characteristic. The soils in the <i>Central Appalachian dry oak-pine forest</i> are coarse and infertile. The forest is mostly closed-canopy but can include more open woodlands. It is dominated by a variable mixture of dry-site oak and pine species, most typically chestnut oak, Virginia pine and white pine. The system may include areas of oak forest, pine forest (usually small), and mixed oak-pine forest. Heath shrubs such as Blue Ridge blueberry, black huckleberry, and mountain laurel are common in the understory and often form a dense layer (Gawler 2008).</p>	<p>Migratory species</p>

Priority Refuge Resources of Concern ¹	Habitat Structure ²	Associated Species ³
Forested Uplands and Wetlands⁴		
Hardwood Swamp⁵ - 530 acres		
North-Central Appalachian acidic swamp ^H North-Central Interior and Appalachian rich swamp ^H	Eastern hemlock is usually present and may be dominant in the <i>North-Central Appalachian acidic swamp system</i> . It is often mixed with deciduous wetland trees such as red maple or black tupelo. Species of the genus <i>Sphagnum</i> are an important component of the moss layer. <i>North-Central Interior and Appalachian rich swamps</i> are found in basins where higher pH and/or nutrient levels are associated with a rich flora. Species include red maple, black ash (<i>Fraxinus nigra</i>), as well as calcium loving (calciphilic) herbs. Conifers include American larch, but typically not Northern white cedar, which is characteristic of more northern wetland systems. There may be shrubby or herbaceous openings within the primarily wooded cover. The substrate is primarily mineral soil, but there may be some peat development (Gawler 2008).	Migratory species
Shrub Swamp and Floodplain Forest⁵ - 51 acres		
Laurentian-Acadian wet meadow-shrub swamp ^H	This system encompasses shrub swamps and wet meadows on mineral soils and are often associated with lakes and ponds, but are also found along streams, where the water level does not fluctuate greatly. They are commonly flooded for part of the growing season but often do not have standing water throughout the season. The size of occurrences ranges from small pockets to extensive acreages. The system can have a patchwork of shrub and grass dominance; typical species include willow, silky dogwood, speckled alder, white meadowsweet, bluejoint, tall sedge, and common rush. Trees are generally absent and, if present, are scattered (Gawler 2008).	Migratory species
Woodlands (natural)⁵ - 9 acres		
Central Appalachian pine-oak rocky woodland ^H	This system of the central Appalachians encompasses open or sparsely wooded hilltops and outcrops or rocky slopes. The substrate rock is granitic or of other acidic lithology. The vegetation is patchy, with woodland as well as open portions. Pine species are indicative and often are mixed with Oak species. Some areas have a fairly well-developed heath shrub layer; others a grass layer. Conditions are dry and nutrient-poor, and many, if not most, sites have a history of fire (Gawler 2008).	Uncommon plant community within the landscape that contributes to BIDEH*

Priority Refuge Resources of Concern ¹	Habitat Structure ²	Associated Species ³
Non-Forested Uplands and Wetlands⁴		
Freshwater Marshes⁵ - 5 acres		
Laurentian-Acadian freshwater marsh ^H	These freshwater emergent and/or submergent marshes are dominated by herbaceous vegetation. They occur in closed or open basins that are generally flat and shallow. They are associated with lakes, ponds, slow-moving streams, and/or impoundments or ditches. The herbaceous vegetation does not persist through the winter. Scattered shrubs are often present and usually total less than 25% cover. Trees are generally absent and, if present, are scattered. The substrate is typically muck over mineral soil. Vegetation includes common bulrush, narrow-leaf cattail, marsh fern, common jewelweed and sedges (Gawler 2008).	Uncommon plant community within the landscape that contributes to BIDEH*
Pasture/Hay/Grassland⁵ – 1,015 acres		
Where appropriate, maintain as contiguous block of grassland habitat	Grasslands include fields managed for warm season grasses, such as switch grass, Indian grass, and blue stem, hayfields/pastures that are intensively managed for cool season grasses and active pastures.	American Woodcock ^{A, I, J} Bobolink^{A, I} Upland Sandpiper^{A, I} Northern Harrier ^{I, J} Grasshopper Sparrow^I Eastern Meadowlark^I Field Sparrow ^{A, I} Eastern Kingbird ^{A, I} American Kestrel ^I
Cliff and Talus⁵ – 4 acres		
North-central Appalachian circum-neutral cliff and talus ^H	This cliff system occurs at low to mid elevations and consists of vertical or near-vertical cliffs and steep rocky slopes. Substrates include limestone, dolomite and other rocks. The vegetation varies from sparse to patches of small trees, in places forming woodland or even forest vegetation. Ash, basswood and American bladdernut are woody indicators of the enriched setting. The herb layer includes at least some species that are indicators of enriched conditions, e.g., yellow jewelweed, purple cliffbrake, ebony spleenwort, or bluntlobe cliff fern (Gawler 2008) .	Uncommon plant community within the landscape that contributes to BIDEH*

Priority Refuge Resources of Concern ¹	Habitat Structure ²	Associated Species ³
Inland Aquatic Habitats⁴		
Water⁵ – 6 acres		
American Eel^{E, F}	Migrating and feeding habitat includes lakes, streams and large rivers (USFWS 1996)	Riverine Clubtail ^I Skillet Clubtail ^I
Brook Trout^F	Spawning habitat includes clear, well oxygenated cold water lakes/ponds/streams with silt-free rocky substrate, abundant cover, vegetated banks, stable temperatures and stream flow (VTWAP 2005).	Longnose Dace ^I Cobra Clubtail ^I

1 - These species of conservation concern and associated habitats, as well as under-represented and sensitive ecological systems constitute the management focus for the CFA, and recommended for the CPA. They were identified based on specific criteria, and are included in the following plans, databases and/or have Federal status.

A: 2008 Bird Conservation Region 30.

B: 2009 North Atlantic Landscape Conservation Cooperative Development and Operations Plan.

C: 2008 USFWS Birds of Conservation Concern.

D: Federal Threatened and Endangered status as of 2010, including Candidate Species

E: Federal Elevated Concern species or species petitioned for threatened and endangered listing as of 2010

F: 2009-2013 USFWS Northeast Region Fisheries Program Strategic Plan

G: Silvio O Conte Refuge Purpose Species.

H: 2008 Northeastern Terrestrial Habitat Classification System.

2 - This habitat structure will benefit the listed priority refuge resources of concern, and is based on the most recent literature.

3 - These species are a compilation from the following plans, and are associated with the habitat type and/or will benefit from all or a portion of the habitat structure associated with the priority species. This is not a comprehensive list of species.

A: 2008 Bird Conservation Region 30.

I: 2005 Connecticut Comprehensive Wildlife Conservation Strategy

J: 2012 Terrestrial and Wetland Representative Species of the North Atlantic: Species Selected, Considered, and Associated Habitats (Ecological Systems). These species were LCC candidate species and are represented by the selected LCC Representative Species.

4 - CCP Objectives from Silvio O. Conte NFWR Comprehensive Conservation Plan, Chapter 4, Service - preferred Alternative.

5 - These habitat types are based on the North Atlantic Landscape Conservation Cooperative (NALCC) habitat groupings for associated Representative Species, which were derived from The Northeastern Terrestrial Habitat Classification System (NETHCS). See table A.52 for a comparison of the NALCC habitat groupings and NETHCS.

BOLD - These species are LCC Representative Species, which is a species that, because of its habitat use, ecosystem function, or management response, typifies lifecycle or habitat requirements for a larger group of species.

* The Refuge Improvement Act directs the US Fish and Wildlife Service to maintain Biological Integrity, Diversity, and Environmental Health (BIDEH).

Elements of BIDEH are represented by native fish, wildlife, plants and their habitats as well as those ecological processes that support them.

Goals, Objectives, and Strategies for Refuge Lands in the Salmon Brook CFA under Alternative C

Goal 1: Wildlife and Habitat Conservation: Promote the biological diversity, integrity, and resiliency of terrestrial and aquatic ecosystems within the Connecticut River watershed in an amount and distribution that sustains ecological function and supports healthy populations of native fish, wildlife, and plants, especially Federal trust species of conservation concern, in anticipation of the effects of climate, land use, and demographic changes.

Objective 1.1: Forested Uplands and Wetlands

Sub-objective 1.1a. (Hardwood Forest)

Improve the diversity of seral stages and (where and when possible) restore historic composition and structure, and improve landscape connectivity of hardwood forest habitat to support species of conservation concern and aid in climate change adaptation. Management will provide stopover habitat for spring and fall migrants.

Rationale:

We envision healthy forests within the Salmon Brook CFA where a diverse seral structure provides suitable habitat conditions for a suite of wildlife. Our long-term vision for the CFA includes hardwood forests characterized by complex horizontal and vertical structure, a generally closed canopy, large-diameter trees, dead woody material, snags and cavity trees, native species diversity, softwood inclusions, and a diversity of wildlife (Foster et al. 1996, Goodburn and Lorimer 1998, Keeton 2006, D'Amato et al. 2009, Curzon and Keeton 2010).

Salmon Brook CFA hardwood forests provide a diversity of habitats for wildlife. To date our review of the Salmon Brook CFA habitats and wildlife species—and their condition—has been limited to coarse-scale information: the careful analysis of spatially-explicit habitat data using GIS, the consultation of local, state, and regional species conservation plans, and an understanding of forest disturbance and land-use history in New England. This allowed identification of broad habitat types, and species of conservation concern known to utilize characteristics common to these habitats. Our understanding of the forest structure within Salmon Brook comes exclusively from a reading of forest history in New England—a legacy of intensive past-use that altered the vegetation structure and composition, landscape patterns, and ongoing ecological dynamics (Cronon 1983, Whitney 1996, Foster et al. 1997, Bellemare et al. 2002, Hall et al. 2002). Our sub-objective assumes the forests of the Salmon Brook are more homogeneous than those of three centuries earlier, and include more sprouting and shade-intolerant species and fewer long-lived mature forest tree species (Goodburn and Lorimer 1998, Foster et al. 1998, Foster 2000, Bellemare et al. 2002, Cogbill et al. 2002, Abrams 2003). Completing a comprehensive forest and habitat inventory post-acquisition will test these assumptions, and aid in identifying stands where a forest management approach that combines passive management and the application of silvicultural treatments designed to emulate gap dynamics, will promote compositional and structural diversity, and where appropriate, move succession forward to emulate later seral stage characteristics.

Migrating landbirds are typically unable to deposit sufficient fat stores to fly nonstop between breeding and nonbreeding areas (Blem 1980) and must use stopover habitats for feeding and resting before continuing migration. Studies have shown migrating birds exhibit selective use of some habitats over others (Moore et al. 1990, Petit 2000, Rodewald et al. 2004). In general, taller, more structurally diverse vegetation types within an area appear to support greater numbers of migrating birds than do habitats of lower stature and complexity (Moore et al. 1990, Noss 1991). Clearly, structurally complex habitats will not be suitable for all migratory species, but our conservation goal is to provide those areas used most frequently by migrating birds, suggesting relatively tall, structurally diverse habitats may best serve this purpose. The plasticity in habitat use exhibited by most species during migration (Moore et al. 1990, Petit 2000) suggests that many species are able to effectively use the food resources and cover afforded by structurally complex habitats. While our management goals may create a relatively old forest, hardwood forests within Salmon Brook will contain a variety of patches in different age classes and developmental stages; it is not uniform throughout. This diversity of age classes provides a variety of bird species with a range of foraging opportunities. Patches of mature edge-dominated (i.e. forest-agricultural edge and suburban forest of the type within Salmon Brook) and shrub-sapling stage forests were used most frequently by fall stopover migrants in a Pennsylvania study (Rodewald et al. 2004).

In a mature forest, many migrating bird species tend to remain within specific vegetation layers: on or near the ground, in the middle layer, or up in the canopy. Salmon Brook's hardwood forests should have all forest layers present in moderate to high amounts distributed throughout a stand and across the landscape. Enhanced vertical structure will provide the greatest number of bird species with the greatest number of foraging opportunities. Our active forest management efforts will aim to create or maintain a canopy that is generally closed (greater than 75 to 80 percent closure) with small gap openings scattered throughout a stand and the CFA. These openings will be caused by or mimic small, single- to few-tree disturbances and create opportunities for regenerating intermediate- and shade-tolerant species. Regeneration in these openings will provide a continual supply of ephemeral shrub-sapling habitat rich in fruits and insects important to migrating birds (Noss 1991, DeGraaf et al. 2006). Efforts to regenerate a diversity of species must contend with evidence of reduced diversity or damage to tree seedlings and herbaceous plants attributed to white-tailed deer (Hough 1965, Anderson and Loucks 1979, Tilghman 1989, Rooney and Waller 2003, Côté et al. 2004, Rawinski 2008).

Implementation of refuge strategies will begin with a comprehensive, multi-scale forest and wildlife habitat inventory. Forest wildlife species survival and breeding success is dependent not only on the habitat at the stand level, but also the surrounding landscape, making it necessary to consider the proportions and sizes of stand types and successional stages within the CFA and the associated landscape. Baseline information on the condition of hardwood forests at the time of acquisition will further inform more detailed, stand-level habitat prescriptions within a required step-down HMP.

Management Strategies:

Within 5 years of land acquisition and CCP approval:

- Identify forest stands with late successional characteristics for passive management, and those where active management is necessary to improve forest structure. Appendix J provides general forest management guidelines, including descriptions of forestry techniques and explanations about how we will determine where and how to conduct active management.
- Work with partners, including CTDEEP in support of the State Wildlife Action Plan, to ensure management on Service lands complement adjacent land management objectives.

Within 10 years of land acquisition and CCP approval:

- Implement identified active forest management opportunities using accepted silvicultural practices. Appendix J provides general forest management guidelines, including descriptions of forestry techniques and explanations about how we will determine where and how to conduct active management.
- Protect hard and soft mast producing species such as American beech inclusions, and apple and cherry trees, through the use of best management practices.
- Ensure a diversity of native species is present and non-native species are excluded or managed to keep population levels as low as possible.
- Explore research opportunities with academic partners to address efficacy of forest management in meeting wildlife objectives.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Conduct forest and wildlife inventories.
- Map vernal pools and seeps.
- Map natural communities; protect rare or exemplary examples.

Sub-objective 1.1b. (Hardwood swamp)

Improve the diversity of seral stages, (where and when possible) restore historic composition and structure, and improve the natural hydrology to support natural and rare ecological communities. Management will provide stopover habitat for spring and fall migrants.

Rationale:

Occurrences of hardwood swamps within the Salmon Brook CFA represent a number of natural communities. Historically they have undergone significant alteration, and have great potential for restoration. Acidic hardwood swamps may be found in basins, or on gently sloping seepage lowlands within small patches where an acidic substrate of mineral soil, often with a component of organic muck, creates a shallow, perched water table. Eastern hemlock is often the dominant overstory species, and the organic substrate supports an important sphagnum (moss) layer. Within the Connecticut River watershed, including the CFA, agricultural practices, development pressure, and selective logging have largely removed this habitat from the landscape, or greatly simplified its historic species composition. Changes in hydrology, water pollution, invasive species introductions, and soil compaction remain as threats.

Successional trends in hardwood swamps are not well understood. One possibility is that these areas were once in softwoods such as hemlock, fir, cedar, or spruce. Heavy cutting and clearing for agriculture often eliminated softwood species. Our conservation efforts within the Salmon Brook will focus on promoting the ecological integrity of these stands through restoration of degraded floodplains, and (where and when possible) restoring composition and structure to accepted historical conditions. Restoration of the primary natural disturbance mechanism (seasonal flooding) will aid in the restoration of historical species mixtures.

Restoration of forest habitats, natural levees, backwater sloughs, and oxbow lakes will create high-quality habitat for spring and fall migrant birds in an otherwise agricultural landscape where small, disturbed forest fragments are the rule. Closed canopy deciduous forests that include pin oak and other hardwoods provide mast and other foraging sites shown to be important during the energy-intensive migration (Petit 2000).

Implementation of refuge strategies will begin with a comprehensive, multi-scale forest and wildlife habitat inventory. Forest wildlife species survival and breeding success is dependent not only on the habitat at the stand level, but also the surrounding landscape, making it necessary to consider the proportions and sizes of stand types and successional stages within the CFA and the associated landscape. Baseline information on the condition of hardwood swamps at the time of acquisition will further inform more detailed, stand-level habitat prescriptions within a required step-down HMP.

Management Strategies:

Within 5 years of land acquisition and CCP approval:

- Work with partners, including CTDEEP in support of the State Wildlife Action Plan, to ensure management on Service lands complement adjacent land management.
- Evaluate hydrologic regime to inform restoration efforts.
- Identify forest stands where management is necessary to improve species composition. Appendix J provides general forest management guidelines, including descriptions of forestry techniques and explanations about how we will determine where and how to conduct active management.

Within 10 years of land acquisition and CCP approval:

- Implement identified forest management opportunities to improve species composition. Appendix J provides general forest management guidelines, including descriptions of forestry techniques and explanations about how we will determine where and how to conduct active management.
- Explore research opportunities with academic partners to address efficacy of forest management in meeting wildlife objectives.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Conduct forest and wildlife inventories.
- Map vernal pools and seeps.
- Map natural communities; protect rare or exemplary examples.

Sub-objective 1.1c. (Shrub Swamps and Floodplain Forest)

Restore native species composition and structure, and improve the natural hydrology, as needed, to support natural and rare shrub swamp and floodplain forest ecological communities. Management will provide stopover habitat for spring and fall migrants.

Rationale:

The shrub swamps in the Salmon Brook CFA are restricted to poorly drained areas and small seepage zones along Hungary and Mountain Brooks. These shrub swamp systems usually have a patchwork of shrub and grass dominance, and may include willow, silky dogwood, speckled alder, white meadowsweet, bluejoint, tall sedge, and common rush (Gawler 2008). Based on our coarse-scale habitat analysis, the shrub swamps are also adjacent to agricultural land, and impacts to the wetland hydrology may be factor. Water pollution and invasive species introductions are also threats for shrub swamp communities.

Restoration of shrub swamp communities, as well as the surrounding forested habitat, will create high-quality habitat for neotropical migratory birds in an otherwise agricultural landscape where small, disturbed forest fragments are the rule. The Connecticut River watershed is a major migration corridor. The lower portion of the watershed (CT and MA) receives higher use by migrants, with use concentrated in habitats along the Connecticut River main stem (Smith College 2006). The Salmon Brook CFA is situated near the Connecticut River, and can provide significant stopover habitat for migrants in the spring and fall. Neo-tropical migrants typically use similar habitats during migration as they do during the breeding season (Petit 2000). Species such as gray catbird, yellow-rumped warbler, white-eyed vireo, eastern phoebe, eastern kingbird and common yellowthroat will use shrubland communities (McCann et al. 1993). Native shrubs will provide migrants with soft mast and abundant insects to replenish fat reserves, and structure to provide rest and adequate cover from predators and inclement weather.

Implementation of refuge strategies will begin with a comprehensive, multi-scale wildlife habitat inventory. Wildlife species survival and breeding success is dependent not only on the habitat at a fine scale, but also the surrounding landscape, making it necessary to look at the adjacent habitat conditions and land uses within the CFA and associated landscape. Baseline information on the condition of shrub swamps at the time of acquisition will further inform more detailed habitat prescriptions within a required step-down HMP.

Management Strategies:

Within 5 years of land acquisition and CCP approval:

- Minimize refuge activities that disturb wetland communities.
- Work with partners, including CTDEEP in support of the State Wildlife Action Plan, to ensure management on Service lands complement adjacent land management objectives.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Survey wildlife utilization of wetlands.
- Map natural communities; protect rare or exemplary examples.

Sub-objective 1.1d. (Biological Integrity, Biological Diversity, and Environmental Health)

Where and when appropriate, protect, or restore habitats absent an identified species of conservation concern, recognizing the importance of all habitats in contributing to the biological integrity, diversity, and environmental health of refuge lands and the Watershed.

Rationale:

Achieving the refuge purposes and the Refuge System mission are the paramount considerations for refuge management. Additionally, the Service has policy for maintaining and restoring, where appropriate, refuges' "biological integrity, diversity, and environmental health" (601 FW 3). This policy provides refuge managers with a process to analyze their refuge and recommend the best management direction to prevent further degradation of environmental conditions; and where appropriate, restore lost or severely degraded components. The policy

suggests using historic conditions as a reference for comparing the ecosystem's current composition, structure, and functioning to what it was prior to substantial human related changes to the landscape. This comparison can be used to direct management to maintain or restore those natural conditions, to the extent practicable, without jeopardizing refuge purposes. For example, we consider the natural timing and frequency of disturbances, such as fires and flooding, and mimic those processes. In other words, the policy is intended to induce management for native fish, wildlife, and plants and their habitats in natural conditions, and with natural processes, using historic conditions to help identify such conditions and processes (Paveglio et al. 2010). However, we recognize that it is not always possible or desirable to try to mimic historic conditions, particularly in the face of predicted climate and land use changes and other landscape-scale considerations. Historic conditions are only one of many considerations when making decisions about how to manage refuge resources.

Conservationists often use the metaphor of coarse filters and fine filters to convey two complementary strategies for maintaining biological diversity, biological integrity, and environmental health: the first focuses on conserving ecosystems and the second focuses on species (Noss 1987, Hunter 1991, Groves 2003). The coarse-filter approach seeks to protect a representative array of natural ecosystems and their constituent processes, structures, and species (the refuge); however, some species fall through its pores, and coarse filters must be complemented by fine filter strategies tailored to fit particular species (priority species of concern). Sub-objectives throughout this plan generally represent a fine-filter approach—identifying species and their habitats that the USFWS has identified as priorities based upon our establishing legislation, refuge system mission, regional and national conservation plans, and conversations with conservation partners. In contrast, this sub-objective outlines CFA management that will benefit many of its species, the majority of which will not receive the special, tailored attention of fine-filter conservation. The BIDEH policy guidance complements coarse-filter conservation in ways that fine-filter conservation misses.

The key idea of BIDEH conservation is that most ecosystems contain certain features that are critical to the welfare of many species; thus, conserving those features can have a positive effect on a large suite of species (biological diversity). Logs in a forest, hedgerows in an agricultural landscape, and streams and pools in many terrestrial ecosystems are all examples of ecosystem features that support far more species than one would predict based on their size alone. The importance of conserving these features is widely recognized, but in an ad hoc, idiosyncratic fashion that often does not recognize the commonality between maintaining a hedgerow, a rock outcrop, and an herbaceous wetland. BIDEH conservation overlaps with many aspects of matrix management and ecosystem management (Lindenmayer and Franklin 2002). A key difference is its specific focus on ecosystem elements, which explicitly complements coarse-filter and fine-filter conservation.

Habitats that occur within the Salmon Brook CFA where species-specific management guidelines are not identified will be managed under the umbrella BIDEH policy. These habitats are most often small or isolated occurrences, but are important in maintaining connectivity within the larger forested matrix, and providing additional structural and species diversity to the matrix. Rocky outcrops and upland meadows, for instance, are anomalies in an otherwise forested landscape. They often have a special flora and fauna—providing sunny, dry sites for reptiles to bask, or nectar producing flowers for foraging butterflies. One could make the case that these outcrops are small, independent ecosystems, but they are really too small to be candidates for a classic coarse-filter strategy and thus best considered in a BIDEH context. This approach will allow the conservation of large numbers of species, the majority of which are too poorly known to be conserved individually (e.g., imagine species conservation plans for particular insects or liverworts). Together, the multiple strategies are reasonably comprehensive because all species and habitats known to be in jeopardy will receive needed attention.

The negative consequences of habitat loss and fragmentation to aspects of biological integrity, diversity, and health have been shown by a large number of theoretical and empirical studies, in different environments, and for a large array of taxa (Fahrig 2003) with different authors measuring fragmentation in different ways and, as a consequence, drawing different conclusions regarding both the magnitude and direction of its effects. Habitat fragmentation is usually defined as a landscape-scale process involving both habitat loss and the breaking apart of habitat. Results of empirical studies of habitat fragmentation are often difficult to interpret because (a. Our understanding of the current condition of all the habitats considered under this sub-objective and their contribution to the BIDEH of the CFA is poor. A comprehensive forest and wildlife habitat inventory will be necessary to inform more detailed management strategies that provide the full range of natural processes.

Management Strategies:

Within 5 years of CCP approval:

- Work with partners, including CTDEEP in support of the State Wildlife Action Plan, to ensure management on Service lands complement adjacent land management objectives.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Conduct habitat and wildlife inventories.
- Map natural communities; protect rare or exemplary examples.

Objective 1.2: Non-forested Uplands and Wetlands

Sub-objective 1.2a. (Pasture/Hay/Grassland)

Where appropriate, maintain a contiguous block of grassland habitat for breeding and migrating grassland bird species; areas not managed for grassland birds will be allowed to revert to natural conditions.

Rationale:

Over 34 percent of the Salmon Brook CFA is typed as pasture, hay, and grassland, consisting mostly of large fields between 50 to almost 200 acres. Management of these fields as grassland habitat would benefit declining grassland bird species, and provide a habitat that is increasingly rare in the region.

Native grasslands were once more widespread in North America. A deterioration of rangelands, the conversion of prairies to agriculture, and afforestation of the eastern United States are significant factors to the decline of grassland bird populations. During European settlement, millions of acres of forests were cleared for agriculture in the eastern U.S., creating habitat for grassland dependent birds. As agricultural activities declined, open areas dominated by herbaceous vegetation began to convert back to forests, causing a drastic decline in grassland species in the region (Brennan and Kuvlesky Jr. 2005).

In fact, several grassland species are listed as threatened or endangered by the state of Connecticut, including northern harrier, upland sandpiper, barn owl, and grasshopper sparrow. Grasslands are a high priority habitat for the state, and maintaining large, contiguous acres of warm season grasses at the Salmon Brook CFA would benefit these species.

We also support the protection of high-value, productive agricultural lands identified by local communities and the State. It is not the refuge's intention to target these lands for acquisition. Instead, our priority would be to work with individual landowners, states, and other Federal agencies to protect these lands and ensure they continue to be part of the working landscape. There are many State and Federal programs that protect agricultural lands and help promote farming practices that benefit wildlife and help protect water quality. Through our private lands program, we will help direct landowners who are interested in these programs to the proper state and Federal agencies and programs. In rare cases, we may acquire agricultural lands from willing sellers, when other options to keep the land in agricultural production are not available, or if habitats for Federal trust resources are in jeopardy from development or other land use changes.

Due to our unfamiliarity with the habitat conditions in the CFA, a comprehensive, multi-scale habitat and wildlife inventory will be necessary to implement refuge strategies. This inventory will need to encompass all habitats within the CFA and associated landscape. This baseline information will further inform more detailed habitat prescriptions within a required step-down HMP.

Management Strategies:

Within 5 years of land acquisition and CCP approval:

- Work with partners and landowners to promote farming practices (ie. haying and pastured animals) that benefit grassland birds.

Inventory and Monitoring Strategies:

Within 5 years of CCP approval:

- Assess the condition of pasture, hay and grassland habitats, as well as the overall size and location in the CFA, and proximity to other forest openings, to inform more detailed management strategies in an HMP.

Sub-objective 1.2b. (Biological Integrity, Biological Diversity, and Environmental Health)

Where and when appropriate, protect, or restore habitats absent an identified species of conservation concern, recognizing the importance of all habitats in contributing to the biological integrity, diversity, and environmental health of refuge lands and the watershed.

Rationale:

See rationale for sub-objective 1.1d.

Habitats that occur within the Salmon Brook CFA where species-specific management guidelines are not identified will be managed under the umbrella BIDEH policy. These habitats are most often small or isolated occurrences, but are important in maintaining connectivity within the larger forested matrix, and providing additional structural and species diversity to the matrix. Rocky outcrops and upland meadows, for instance, are anomalies in an otherwise forested landscape. They often have a special flora and fauna—providing sunny, dry sites for reptiles to bask, or nectar producing flowers for foraging butterflies. One could make the case that these outcrops are small, independent ecosystems, but they are really too small to be candidates for a classic coarse-filter strategy and thus best considered in a BIDEH context. This approach will allow the conservation of large numbers of species, the majority of which are too poorly known to be conserved individually (e.g., imagine species conservation plans for particular insects or liverworts). Together, the multiple strategies are reasonably comprehensive because all species and habitats known to be in jeopardy will receive needed attention.

The negative consequences of habitat loss and fragmentation to aspects of biological integrity, diversity and health have been shown by a large number of theoretical and empirical studies, in different environments, and for a large array of taxa (Fahrig 2003) with different authors measuring fragmentation in different ways and, as a consequence, drawing different conclusions regarding both the magnitude and direction of its effects. Habitat fragmentation is usually defined as a landscape-scale process involving both habitat loss and the breaking apart of habitat. Results of empirical studies of habitat fragmentation are often difficult to interpret because (a. Our understanding of the current condition of all the habitats considered under this sub-objective and their contribution to the BIDEH of the CFA is poor. A comprehensive forest and wildlife habitat inventory will be necessary to inform more detailed management strategies that provide the full range of natural processes.

Management Strategies:

Within 5 years of CCP approval:

- Work with partners, including CTDEEP in support of the State Wildlife Action Plan, to ensure management on Service lands complement adjacent land management objectives.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Conduct habitat and wildlife inventories.
- Map natural communities; protect rare or exemplary examples.

Objective 1.3: Inland Aquatic Habitats

Sub-objective 1.3a. (Open Water)

In collaboration with partners, manage water resources and riparian areas to provide cold temperature regimes, substrate diversity, and clear aquatic species passage that benefit priority refuge resources of concern including Eastern brook trout and American eel.

Rationale:

Mountain Brook meanders through the agricultural lands of the Salmon Brook CFA. Mountain Brook is a tributary to the much larger Salmon Brook, a tributary of the Connecticut River. There are few migration barriers along the Salmon Brook, which supports native brook trout, and spawning river herring at its mouth (outside the CFA boundary). Mountain Brook is a cold water stream that provides habitat for brook trout and American eel. Eastern brook trout is a state and refuge species of conservation concern, and American eel is petitioned for listing under the Endangered Species Act.

The naturally reproducing Eastern brook trout populations in Mountain Brook are sensitive to extreme temperature fluctuations, and require water temperatures between 40 to 70 degrees Fahrenheit for spawning, growth, and survival. American eel enter the Connecticut River as juveniles, and migrate upstream to inhabit bays, estuaries, streams, lakes, and ponds, including those found in the Salmon Brook CFA. Eels feed in these aquatic habitats until they reach sexual maturity and begin the long migration to their spawning grounds in the Sargasso Sea (ASMFC 2000).

Improving water quality and native fish habitat within the Salmon Brook CFA will require a comprehensive, multi-scale habitat and wildlife inventory. Due to our lack of knowledge regarding habitat conditions in this CFA, this inventory will need to encompass all habitats within the CFA and associated landscape. This baseline information will further inform more detailed habitat prescriptions within a required step-down HMP.

Management Strategies:

Within 5 years of land acquisition and CCP approval:

- Conduct stream assessments to evaluate stream and fish community health.

Objective 1.4: Coastal Non-forested Uplands (coastal beaches and rocky shores)

Not applicable

Objective 1.5: Coastal Wetlands and Aquatic Habitats (tidal salt marsh and estuary)

Not applicable

Goal 2: Education, Interpretation, and Outreach: Inspire residents and visitors to actively participate in the conservation and stewardship of the exceptional natural and cultural resources in the Connecticut River watershed, and promote a greater understanding and appreciation of the role of the Silvio O. Conte National Fish and Wildlife Refuge in conserving those resources.

Objective 2.1: Environmental Education

In collaboration with public and private educators from all four states in the watershed, lead or facilitate the implementation of structured natural and cultural resource curricula, with a focus on guiding educators and students to develop an awareness of, and concern about, natural and cultural resources and associated challenges; appreciate our conservation history; make informed decisions and work individually or collectively toward solutions; and model responsible environmental stewardship in their everyday lives.

Sub-objective 2.1a. (Environmental Education Planning and Training)

Encourage schools, scout groups, and summer camps to develop curricula that use the Salmon Brook Division as an outdoor classroom.

Rationale:

See environmental education rationale in chapter 4 detailing the importance of environmental education for the Service. Environmental education is one of the six priority, wildlife-dependent recreational uses of the Refuge System. Environmental education is particularly important at Conte Refuge because one of its founding purposes is to provide opportunities for environmental education. Environmental education is an important tool that can help refuge visitors and local residents, particularly students, appreciate the importance of this area to the larger watershed.

Management Strategies:

Within 1 year of acquiring sufficient land:

- Encourage schools, scout groups, and summer camps to develop curricula that use the Salmon Brook Division as an outdoor classroom.

Sub-objective 2.1b. (Environmental Education Delivery)

Encourage schools, scout groups, and summer camps to use the Salmon Brook Division as an outdoor classroom.

Rationale:

Because this division will be unstaffed, the majority of environmental education opportunities on this division will be led by partners, volunteers, and local school groups and other educational groups (e.g., scout groups and summer camps).

Management Strategies:

Within 1 year of acquiring sufficient land:

- Encourage schools, scout groups, and summer camps to develop curricula that use the Salmon Brook Division as an outdoor classroom.

Objective 2.2: Interpretation

Develop, lead, and facilitate interpretive programs that emotionally and intellectually connect the audience to natural and cultural resources in the watershed.

Sub-objective 2.2a. (Natural and Cultural Resource Interpretive Planning and Training)

With Friends groups, public and non-profit organizations, and volunteers, offer quality interpretive programming at the Salmon Brook Division. The development of highly trained interpreters will be encouraged by offering interpretive training to Friends' members, partners, and volunteers on a regular basis.

Rationale:

See the rationale in chapter 4 detailing the importance of interpretation for the Service. Interpretation is an important tool that can help refuge visitors and local residents appreciate the importance of this area to the larger watershed. With an ADA compliant trail planned for the site, the Salmon Brook Division will be well suited to support both self-guided, wildlife dependent interpretive experiences, as well as guided interpretive programs that convey messages about the refuge and about the Salmon Brook Division's habitats and cultural resources.

Management Strategies:

(These strategies are dependent on land acquisition from willing landowners.)

Within 5 years of acquiring sufficient land:

- Inventory and evaluate each CFA to determine the appropriate interpretive materials to employ.
- Create meaningful, consistent, thematic statements to be used in the delivery of programming at the Salmon Brook Division.
- Provide resources and trainings to Friends, and volunteers in support of interpretive programs.

Within 10 years of acquiring sufficient land:

- Develop standardized self-guided interpretive services, such as interpretive trails and kiosks, exhibits, and printed media.

- Employ a variety of themed interpretive offerings (e.g., presentations, audio-visual programs, brochures, and exhibits) when creating programming for natural and cultural resource interpretation.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Build an evaluation process that includes formal and informal evaluation to assess the effectiveness of all interpretation programs.

Sub-objective 2.2b. (Natural and Cultural Resource Interpretive Program Delivery)

Collaborate with Friends group, partners, and volunteers to deliver quality natural and cultural resource interpretive programs.

Rationale:

See rationale for sub-objective 2.2a.

Management Strategies:

(These strategies are dependent on land acquisition from willing landowners.)

Within 5 years of acquiring sufficient land:

- Through partners, and Friends group, annually provide quality interpretive programs, exhibits, printed media at the Salmon Brook Division.
- Incorporate thematic statements, measureable objectives and evaluation measures into all interpretation efforts.
- Publicize interpretive programs through traditional media, on the refuge web site, and digital social media conduits.
- Maintain a supply of print interpretive brochures, i.e., general brochure and bird checklist that incorporate refuge interpretive messages and themes.
- Work with partners to create issue-oriented experiential activities and programs for use at their facilities.

Within 10 years of acquiring sufficient land:

- Contribute refuge interpretive information for scenic byways and other state publications and signs.
- Develop self-guided interpretive messages and use state-of-the-art as well as traditional media e.g. pamphlets, signs, etc.

Objective 2.3: Public and Community Outreach

Support, promote, and coordinate a wide range of outreach tools and activities to facilitate and improve communications and relationships with the American public, especially communities, adjacent landowners, and elected officials in the Connecticut River watershed, and to empower citizens to recognize and resolve local natural resource issues and promote conservation and the responsible use of natural resources.

Because the Salmon Brook Division would be unstaffed and does not have refuge facilities, public and community outreach for this site will occur through regular outreach activities at the headquarters and will not specifically occur at this site.

Objective 2.4: Science and Technical Outreach

Facilitate the collection and exchange of information that increases the knowledge and understanding of natural and cultural resources, addresses climate change and other conservation issues, and provides land managers with better information to make management decisions affecting resources.

Because the Salmon Brook Division would be unstaffed and does not have refuge facilities, science and technical outreach for this site will occur through regular outreach activities at the headquarters and will not specifically occur at this site.

Goal 3: Recreation: Promote high-quality, public recreational opportunities in the Connecticut River watershed that are complementary between ownerships and provide regional linkages with emphasis on promoting wildlife-dependent activities that connect people with nature.

Objective 3.1: Hunting

Support quality public hunting opportunities in the Connecticut River watershed to promote a unique understanding and appreciation of natural resources and their management on lands and waters, while also protecting a traditional outdoor pastime deeply rooted in America's natural heritage and conservation history.

Sub-objective 3.1a. (Hunting Opportunity, Access, and Infrastructure)

Provide the opportunity for a quality hunting experience based on state regulations.

Rationale:

The Salmon Brook CFA is a popular area to hunt. Currently, public hunting for small game and white-tailed deer (archery only) is available on the Newgate Wildlife Management Area in East Granby. Hunting would be allowed on a newly created division consistent with the final compatibility determination. Retaining hunting opportunities on public lands will ensure this wildlife-dependent recreational activity continues and contribute to the state's population management objectives.

Management Strategies:

(These strategies are dependent on land acquisition from willing landowners and determination that hunting is a compatible use.)

Within 1 year of acquiring sufficient land to support hunting seasons:

- Complete all administrative requirements to officially open to hunting consistent with State hunting regulations and, if necessary, additional refuge-specific regulations.
- Allow hunters access to the refuge outside of the normal division open hours (i.e. 30 minutes before sunrise and 30 minutes after sunset) as long as they are engaged in lawful hunting activities.
- Consult with Connecticut Department of Energy and Environmental Protection, Hunting Review Team in evaluating the suitability of new acquisitions to support a safe, manageable hunt program.
- Post newly acquired properties to ensure refuge boundary lines are clearly marked.
- Install an informational kiosk in a conspicuous location to post information on hunting seasons and other notices to visitors.
- Allow temporary tree stands and blinds that meet state hunting regulations and do not harm trees or other refuge vegetation. Tree stands and blinds must have the owner's name and phone number clearly displayed, and they must be removed at the end of the hunt season.

Within 5 years of acquiring sufficient land to support hunting seasons:

- Work with Connecticut Department of Energy and Environmental Protection to determine whether opportunities exist for state-recognized disabled hunters.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Work with Connecticut Department of Energy and Environmental Protection to evaluate the effectiveness and success of the refuge hunt program in contributing to state population objectives.

Sub-objective 3.1b. (Hunter Education and Outreach)

Provide hunter education classes access to the division and conduct directed outreach to ensure hunters are informed about regulations, hunter ethics, and safety considerations. Develop programs, including brochures, signage, website pages, media releases, etc. to increase interest in hunting at the division.

Rationale:

Hunting is a priority public use that also serves as a population management tool. Providing hunter education instructors the opportunity to use the division with their classes will strengthen connections to the hunting community and student understanding of the role hunting plays in wildlife management. Making relevant information readily available to hunters through a variety of media will improve the quality of the hunting experience.

Management Strategies:

(These strategies are dependent on land acquisition from willing landowners and determination that hunting is a compatible use.)

Within 1 year of acquiring sufficient land to support hunting seasons:

- Produce a hunt brochure that includes a hunt map and information on regulations, hunter ethics, safety considerations, etc. and make it available on the refuge website, at Salmon Brook Division kiosks, through a friends group, and in local businesses.
- Provide visitors with general information on the hunting program and refuge-specific and State regulations through the refuge website, information signs, and a hunting brochure. In all materials related to the hunting program, promote and encourage the use of lead-free ammunition.
- Work with the State to identify and evaluate the impacts associated with requiring the use of non-toxic ammunition for hunting on refuge lands.

Within 5 years of acquiring sufficient land to support hunting seasons:

- Work with Connecticut Department of Energy and Environmental Protection to encourage youth hunting at the division as a means of introducing young people to this traditional recreation activity.
- Offer to host hunter education field courses.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Develop a system to monitor and evaluate the hunting program with hunters and other users to determine if the objective is being met and to allow for adaptive management.

Objective 3.2: Fishing

Support quality, public fishing opportunities in the Connecticut River watershed to promote an understanding and appreciation of natural resources and their management on lands and waters, while also protecting a traditional outdoor pastime deeply rooted in the America's natural heritage and conservation history.

Sub-objective 3.2a. (Fishing Opportunities, Access, and Infrastructure)

Provide quality fishing opportunities at the Salmon Brook Division after completing all administrative procedures to officially open refuge lands to fishing, based on Connecticut Department of Energy and Environmental Protection regulations, and Division-specific conditions, if necessary.

Rationale:

There are several streams in the proposed CFA including Salmon Brook, East Branch Salmon Brook, Muddy Brook, and Holcomb Brook. These rivers support cold water fisheries that include Eastern brook trout. A variety of other game fish are found in streams and ponds within the CFA. Fishing is a popular activity throughout this area and would continue under Service ownership, consistent with the final compatibility determination. Retaining fishing opportunities conforms to historic use on CFA and much of the surrounding land in the area.

Management Strategies:

(These strategies are dependent on land acquisition from willing landowners and determination that fishing is a compatible use.)

Within 1 year of acquiring land with fishable waters:

- Complete all administrative requirements to officially open to fishing consistent with State hunting regulations and, if necessary, additional refuge-specific regulations.
- Post newly acquired properties to ensure refuge boundary lines are clearly marked.
- Install an informational kiosk to post information on fishing seasons and other notices to visitors.
- The Salmon Brook Division would be open to visitors actively engaged in fishing during the seasons and times established by the state in their annual fishing regulations.

Within 5 years of acquiring land:

- Produce a brochure that highlights fishing opportunities for distribution at a division kiosk and the refuge website.
- Work with the Connecticut Department of Energy and Environmental Protection to inventory and assess fish populations on the division.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Develop a system to monitor and evaluate the fishing program with anglers and other users to determine the objective is being met and to allow for adaptive management.

Sub-objective 3.2b. (Angler Education and Outreach)

Develop programs, including brochures, signage, website pages, media releases, etc. to inform visitors of fishing opportunities at the division.

Rationale:

Fishing is a priority public use and a traditional use in the CFA. If land is acquired, the refuge will make information readily available to interested anglers regarding opportunities to fish on Service-owned land, location of fishable waters, and the available game fish.

Management Strategies:

(These strategies are dependent on land acquisition from willing landowners and determination that fishing is a compatible use.)

Within 1 year of acquiring land with fishable waters:

- Produce a fishing brochure that includes information on regulations, angler ethics, safety considerations, etc. and make it available on the refuge website, at informational kiosks, and in local businesses. In all materials related to the fishing program, promote use of lead-free tackle.

Objective 3.3: Wildlife Observation and Photography

Support quality, public opportunities to observe and photograph wildlife in the Connecticut River watershed in a variety of natural habitats to connect a broad spectrum of people with nature.

Sub-objective 3.3a. (Infrastructure and Access for Wildlife Observation and Photography)

Provide quality opportunities for wildlife observation and photography at the division.

Rationale:

Wildlife viewing and photography are priority public uses on national wildlife refuges and a popular recreational activity. A new division in this area would offer people the chance to see and photograph wildlife and in their native habitats, while learning more about the Service, Refuge System, and the refuge.

Management Strategies:

(These strategies are dependent on land acquisition from willing landowners and determination that wildlife observation and photography are compatible uses.)

Within 1 year of acquiring land:

- Allow public access from 30 minutes before sunrise to 30 minutes after sunset with the exceptions listed for hunters and anglers. The refuge manager may issue a special use permit for public uses during the closed hours.
- Install an informational kiosk to post information on wildlife observation and photography opportunities, and other notices to visitors.

Within 5 years of acquiring land:

- Develop a public access strategy and required planning (i.e. NEPA, compatibility determination) that includes consideration of developed trails, parking, kiosks, viewing platforms, blinds, interpretation, signage, etc.

Within 15 years of acquiring land:

- Implement the visitor use enhancements identified in the public access strategy and the refuge Visitor Services Plan.

Sub-objective 3.3b. (Wildlife Observation and Photography Aids)

Offer viewing and photography aids that enhance the visitor experience. Use a variety of methods to reach a broad spectrum of people. Work closely with a friends group and other partners.

Rationale:

The entire division would be available for wildlife observation and photography; however, there are steps the refuge can take to enhance the experience. By providing new visitors a quality experience they are more likely to return and share their experiences with others. One way to accomplish this is to offer sufficient information to attract a variety of visitors through a variety of media.

Management Strategies:

(These strategies are dependent on land acquisition from willing landowners and determination that wildlife observation and photography are compatible uses.)

Within 1 year of acquiring land:

- Allow photography blinds that do not negatively impact wildlife behavior or conflict with other visitors. Blinds must be removed each day, unless arrangements have been made via a special use permit.

Within 5 years of acquiring land:

- Develop interpretive panels describing typical wildlife on the refuge, bird migration patterns, and other messages we want to convey to visitors.
- Sponsor wildlife observation events such as International Migratory Bird Day, the Big Sit, etc.
- Encourage local schools, groups, and environmental organizations to include wildlife-centered trips to the refuge.
- Produce a list of wildlife species and associated habitats and other conservation information on the division for distribution at informational kiosks, the refuge website, and other popular media.

Within 10 years of acquiring land:

- Develop a public access strategy and required planning (i.e. NEPA, compatibility determination) that includes consideration of developed trails, parking, kiosks, viewing platforms, blinds, interpretation, signage, etc.

Sub-objective 3.3c. (Watershed-based Partner Initiatives)

Not applicable

Objective 3.4: Other Recreational Activities

In order to reach a broader demographic, support non-priority outdoor recreational opportunities and public access to quality, nature-based experiences throughout the Connecticut River watershed that facilitate and improve community relationships, raise awareness and an appreciation for conserving natural resources, and garner support for the National Wildlife Refuge System.

Sub-objective 3.4a. (Regional Water-based Trail Initiatives and Opportunities Including Refuge Lands)

Develop compatible opportunities on the Salmon Brook Division that support regional water-based trail initiatives to connect people with nature, raise the visibility of the Service and the Refuge System, make the refuge more relevant to the local community, and to promote economic activity in the local area.

Rationale:

Regional water-based trails give individuals opportunities to engage in outdoor recreational opportunities in the Connecticut River watershed, such as fishing, boating, and wildlife observation.

Management Strategies:

Within 5 years of acquiring land:

- As lands are acquired, evaluate any water trails (e.g., canoe/kayak trails) that part of a regional or State network for their compatibility.

Sub-objective 3.4b. (Regional Land-based Trail Initiatives and Opportunities Including Refuge Lands)

Develop compatible opportunities on the Salmon Brook Division that support regional land-based trail initiatives to connect people with nature, raise the visibility of the Service and the Refuge System, make the refuge more relevant to the local community, and to promote economic activity in the local area.

Rationale:

Land-based trails give individuals opportunities to engage in outdoor recreational opportunities in the Connecticut River watershed, such as hiking, wildlife observation, and interpretation. Examples include the Metacomet-Monadnock Trail, part of the New England Trail a National Scenic Trail. Where appropriate, we will work with these partners to promote, and distribute information about, these opportunities. Where appropriate, we will work with these partners to promote, and distribute information about, these opportunities.

Management Strategies:

Within 5 years of acquiring land:

- As lands are acquired, evaluate any existing trails (e.g., hiking trails, snowmobile trails, horseback riding trails) that part of an established regional or State network to determine if they are appropriate and compatible uses for the refuge.

Within 5 years of acquiring land adjacent to or containing a section of the Metacomet-Monadnock (New England) Trail:

- Work with the State of Connecticut, the East Granby Land Trust, adjacent landowners, and other local interests to explore partnership opportunities related to the trail and the surrounding network of conserved lands in the CPA.

Sub-objective 3.4c. (Other Appropriate and Compatible Recreational Opportunities That Enhance Visitor Use and Enjoyment of Refuge Lands)

Allow compatible outdoor recreational opportunities on the Salmon Brook Division that connect people with nature, raise the visibility of the Service and the Refuge System, make the refuge more relevant to the local community, and promote economic activity in the local area.

Rationale:

In addition to the priority public uses, there are other wildlife-dependent, appropriate and compatible recreational activities that can broaden the visitor base, giving people alternative ways to enjoy the natural resources at the division without detrimentally impacting the wildlife resource.

Management Strategies:

(These strategies are dependent on land acquisition from willing landowners and determination that the use is both appropriate and compatible.)

Within 1 year of acquiring land:

- Allow dispersed hiking, snowshoeing, and cross-country skiing.
- Allow pet walking. In order to minimize conflicts with wildlife and other visitors, pets must be on leashes not longer than 10 feet in length.
- Allow recreational gathering of blueberries, blackberries, strawberries, raspberries, mushrooms, fiddleheads, and antler sheds.
- When compatible, allow commercial guiding in support of priority public uses by special use permit.

Within 5 years of CCP approval:

- Work with Friends groups and partners to design and market a virtual geocache course at the division. The course should integrate orienteering with refuge interpretive messages that include linking this division to other refuge properties.

Overview Salmon River Conservation Focus Area (Existing Refuge Division)

East Hampton, Haddam and East Haddam, Connecticut

Conservation Focus Area (CFA)—Acreage Profile	Acres	Percentage of CFA
Total CFA Acres to be Conserved by Service	3,699	85.6 %
■ Existing Refuge Ownership in CFA ¹	425	
■ Additional Acres in CFA proposed for Refuge Acquisition ²	3,274	
Existing Acres in CFA Permanently Conserved by Others ^{2,3}	624	14.4 %
Total Acres in CFA ^{2,4}	4,323	100 %

¹Acres from Service's Realty program (surveyed acres); ²Acres calculated using GIS; ³The Service does not plan to acquire existing conserved lands, except under extenuating circumstances (conserved acres from TNC 2010 data); ⁴The Service would conserve up to this number of acres. The Service only acquires lands from willing sellers.

What specific criteria and/or considerations drove the selection of this CFA?

Salmon River was a SFA in the 1995 Conte FEIS and the refuge's Salmon River Division was established in 2009. The area is considered a priority by The Nature Conservancy, the State of Connecticut, and local constituents because of its tidal freshwater wetlands and location along the mainstem of the Connecticut River. The area is relatively intact and expected to be relatively resilient to climate change. Habitat conservation in this CFA will help allow for the landward migration of the coastal wetland complex (salt-, brackish-, and freshwater tidally influenced wetlands) due to climate change. The Salmon River CFA is also directly across the river from the proposed Maromas CFA. Conserving these two divisions will help provide connectivity on both sides of the Connecticut River. Other existing conserved lands near the Salmon River CFA include the George Dudley Seymour, Haddam Meadows, Haddam Island, and Machimoodus State Parks.

What are the priority habitat types within the proposed CFA? What percentage of the total CFA acreage do they represent?

- Hardwood Forest – 80.8%
- Freshwater Marsh – 1.3%
- Shrub Swamp and Floodplain Forest – 1.2%

For more information on the habitats in the CFA, see map A.12 and table A.10.

What are the resources of conservation concern for the proposed CFA?

As noted in table A.11 below, there are twelve priority refuge resources of concern (PRRC); terrestrial and aquatic species that may rely upon the diverse habitats in this CFA, three of which are Federal candidate species and one which is listed under the Endangered Species Act. There are also habitat types that are not being managed for a particular PRRC species, but are important for their contribution to Biological Integrity Diversity and Environmental Health (BIDEH) of the landscape. This includes extensive tidal wetlands which are part of the Connecticut River estuary system. These wetlands provide habitat for a diversity of species including shorebirds, waterbirds, and waterfowl. The refuge will seek to protect and restore (if necessary) these wetlands and other habitat types. Additionally, we recognize the value of this area to migratory species, forest

interior nesting species, and State Species of Greatest Conservation Need (SGCN). These species and others are discussed further below.

1. Federal Threatened and Endangered Species

The Salmon River CFA is one of 49 New England cottontail Focus Areas (NECFA) in six states. These focus areas are locations to manage and restore habitat for the New England cottontail. New England cottontail is a candidate species for listing under the Endangered Species Act, and is a species of greatest conservation need in Connecticut. "A Conservation Strategy for the New England cottontail" was developed and approved in November 2012, and provides the conservation and habitat management goals and strategies for this species (Fuller and Tur 2012). We plan to work with partners and adjacent landowners to identify areas appropriate for New England cottontail management. We will manage approximately 25 acres of forest in early successional habitat for New England cottontail in the CFA. This approximation of the amount and distribution of acreage over the next 15 years assumes we would have a large enough land base to manage. Our target acreage may also be refined once site conditions are verified and a habitat management plan is completed.

The aquatic habitats in the CFA support two species petitioned for Federal listing, including American eel and brook floater. American eel enter the Connecticut River as juveniles, and migrate upstream to inhabit bays, streams, lakes, and ponds of the Salmon River CFA. Eels feed in these aquatic habitats until they reach sexual maturity and begin the long migration to their spawning grounds in the Sargasso Sea (ASMFC 2000). Brook floater require rivers and streams with high water quality, and are one among many species of freshwater mussels in the CFA.

2. Migratory Birds

The Connecticut River watershed is a major migration corridor. The lower portion of the watershed (CT and MA) receives higher use by migrants, with this use concentrated in habitats along the Connecticut River main stem (Smith College 2006). The Salmon River CFA is situated on the Connecticut River, and the forested habitat and tidal wetlands provide very important stopover and breeding habitat for landbirds and shorebirds.

The PRRC species for the Salmon River CFA include wood thrush and Louisiana waterthrush. This CFA is located within their core breeding range, and the contiguous forests provide breeding habitat for these and other priority conservation concern species. Blue-winged warbler is also a PRRC species, which relies on early successional forests and shrublands in the CFA, habitats in decline throughout the southern portion of the Connecticut River watershed. Bald eagles are also a PRRC species for this CFA. Habitats support nesting, migrating, and wintering bald eagle populations. In addition, the mudflats of the river, creeks and coves, provide foraging habitat for a small number of shorebirds and waders.

3. Waterfowl

The wetland complexes in the Salmon River CFA, consist of shrub swamp and freshwater marsh communities. This habitat is located near the mouth of the Moodus and Salmon Rivers. These areas are flooded during high water events, providing a diversity of plant communities, and habitats for a variety of wildlife species. Large concentrations of American black ducks (a PRRC species), green-winged teal, mallard, Canada geese, and bufflehead utilize these wetlands.

4. Diadromous fish and other aquatic species

The Salmon River serves as the State's reference stream for water quality in the Connecticut River basin and features one of the most diverse and healthy bottom-dwelling invertebrate populations in State. Most of the Salmon River watershed (including upstream of the proposed CFA) is open to migratory aquatic species passage due to the Leesville Dam Fish-way, and other fish-way and dam removal projects. These aquatic habitats support PRRC species such as blueback herring, alewife, brook floater, American eel, and Atlantic salmon.

The Salmon River is still stocked with juvenile Atlantic salmon as part of the CT DEEP's Atlantic Salmon Legacy Program. Along with the Farmington River, it is the only place in the US where wild Atlantic salmon are present outside of Maine. The Salmon River is important migratory habitat for Atlantic salmon, American shad, and shortnose sturgeon (a federally listed species), and spawning habitat for river herring. This area of the Salmon River is also important as overwintering habitat for shortnose sturgeon. American eel, a species petitioned for Federal listing, spends the majority of their young life in

the freshwater systems of this CFA. The Salmon River CFA also provides important aquatic habitat for freshwater mussels, including brook floater, another species petitioned for Federal listing. Sea lamprey, another species of conservation concern, also occurs in this CFA providing important ecological benefits to aquatic systems.

5. Wetlands

From a regional standpoint, there are no areas in the Northeast that support such extensive or high quality fresh and brackish tidal wetland systems as those in the Connecticut River estuary. The lower Connecticut River wetlands and river area consist of over 20 individual tidal wetland units and river islands of various sizes occurring along a 40-mile stretch of the lower Connecticut River from Old Saybrook to Cromwell. Taken as a whole, this area represents a gradation of tidal wetlands from a very narrow zone of relatively high salinity marshes at the mouth of the Connecticut River where it enters Long Island Sound, through an intermediate zone of brackish, lower salinity wetlands, to extensive freshwater tidal marshes and floodplain forests beginning at Deep River and extending upriver to Cromwell (Comins personal communication 2013).

Fifty-five acres of freshwater tidal emergent wetlands and 54 acres of shrub-swamp and floodplain forest occur at the mouth the Salmon River. These tidal wetlands are part of the Connecticut River estuary, and provide habitat for a diversity of species. The Nature Conservancy considers Salmon Cove part of one of the highest quality tidal marsh systems in the Northeast and one of the best tributary systems in the lower reach of the Connecticut River.

One hundred and eighty-seven acres of hardwood swamps are scattered and mostly occur further inland, with the exception of an approximately 57 acre hardwood swamp that occurs on a spit of land at the mouth of the Salmon River.

What habitat management activities would likely be a priority on refuge lands within the proposed CFA?

We will conduct a comprehensive, multi-scale wildlife habitat inventory following acquisition. Baseline information on the condition of habitats (i.e., forested, non-forested and open water habitats) will further inform more detailed habitat prescriptions within a required step-down Habitat Management Plan (HMP). Once inventory has been completed, management will focus on maintaining the following conditions:

- Forest management activities will provide a diversity of seral stages including early successional and mature forested habitats. The forests in the CFA will be structurally diverse and appropriate for site conditions and location. Management of invasive species that weaken or kill native trees (such as Oriental bittersweet) or prevent their regeneration (such as garlic mustard and Japanese stiltgrass) will be a priority. Appendix J provides general forest management guidelines, including descriptions of forestry techniques and explanations about how we will determine where and how to conduct active management.
- We will also manage wetland habitats, and pasture, hay, grassland habitats. Wetland management will focus on maintaining the natural hydrology and native species composition. Invasive plant management will be a priority.
- In open water (streams and rivers) habitats, we will focus on maintaining instream connectivity and outstanding water quality and maintaining cold temperatures for the cold water fisheries. An invasive plant management priority will be to manage species that kill or prevent the regeneration of riparian trees that shade the water. Water chestnut, an invasive aquatic species that can cover and degrade shallow waterbodies has been found in the vicinity and would be a priority for control if found.

What public use opportunities would likely be a priority on refuge lands within the proposed CFA?

We would focus on providing opportunities for the six priority, wildlife-dependent recreational uses: hunting, fishing, wildlife observation and photography, interpretation, and environmental education.

Were there other special considerations in delineating the CFA boundary?

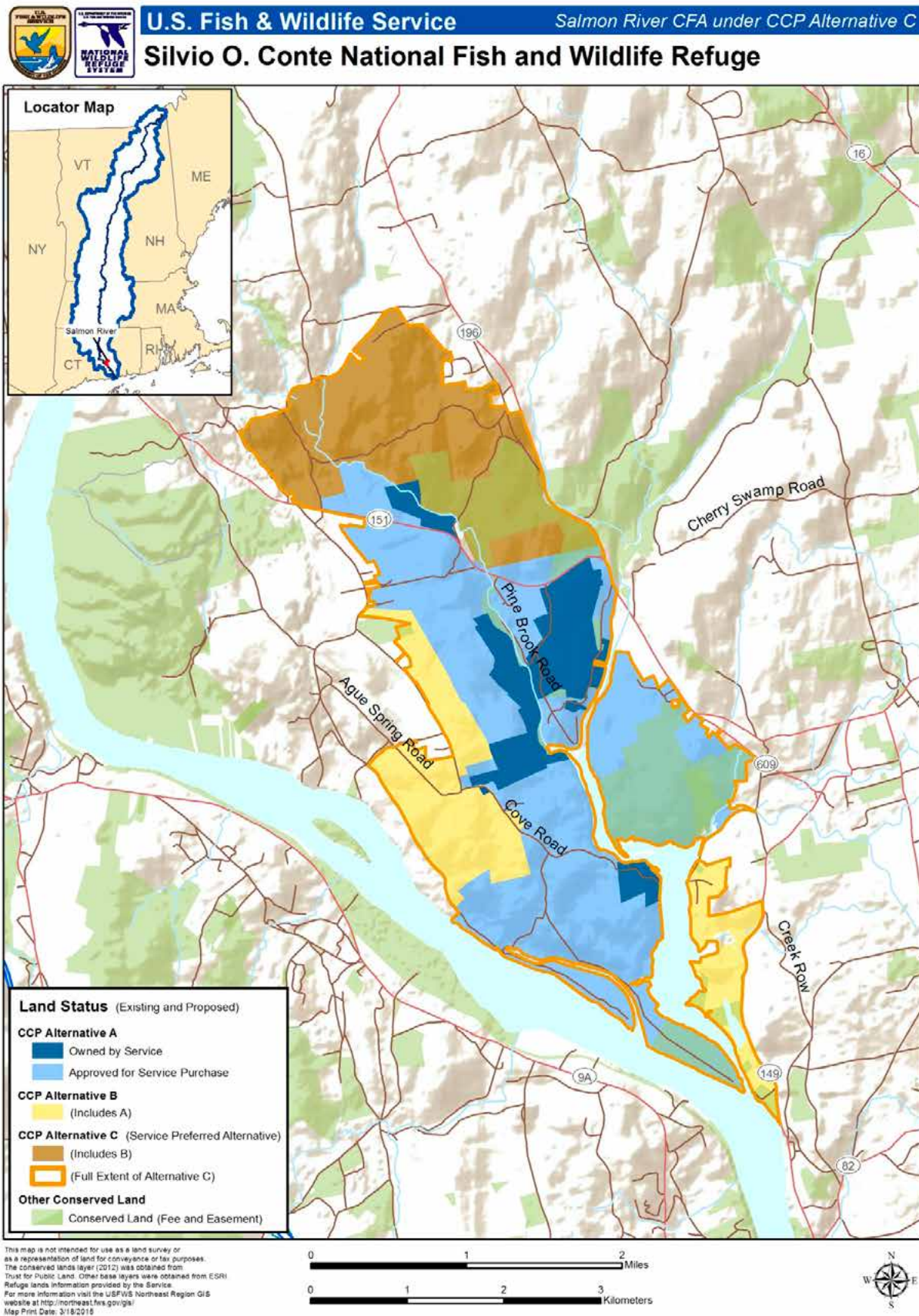
The Venture Smith Site occurs on the existing refuge division. It is an 18th century homestead of African-American archaeological significance and has been identified as potentially eligible for listing on the National Register of Historic Places. Venture Smith (Broteer Furro) was born around 1729 in West Africa, likely in current-day western Mali. At the age of six, he was kidnapped by an enemy tribe and sold to the steward of a Rhode Island slave ship. After a stop in Barbados, Smith was taken to Newport, Rhode Island, and then to Fisher's Island, where he was enslaved for about 13 years.

In 1765, Venture Smith purchased his freedom, and moved to Long Island, where he supported himself by farming, fishing, harvesting wood, river trafficking, and other activities. By 1775, Venture had purchased the freedom of his wife and children. Two years later, he sold his property on Long Island and purchased 10 acres on Haddam Neck in Connecticut, adding 70 acres abutting the Salmon River Cove where he built his dwelling house. He continued to prosper in farming, fishing, lumbering, and river commerce, adding a wharf, small warehouses, blacksmith shop, and other dwellings near his home. In 1798, Venture narrated his life story to Elisha Niles, a Yale graduate and Revolutionary War veteran of anti-slavery background. The published narrative provided an extraordinary account of the American experience of an enslaved African.

Prior to Service acquisition, extensive archaeological investigations were conducted at the site. Evidence of the various homestead buildings was identified, as well as numerous artifacts associated with the lives of Venture Smith and his family.

In addition to the Venture Smith homestead site, the Salmon River Division contains a variety of other archaeological resources, including pre-Contact Native American sites and evidence of other historical settlements.

Map A.11. Salmon River CFA – Location.



Map A.12. Salmon River CPA/CFA – Habitat Types.

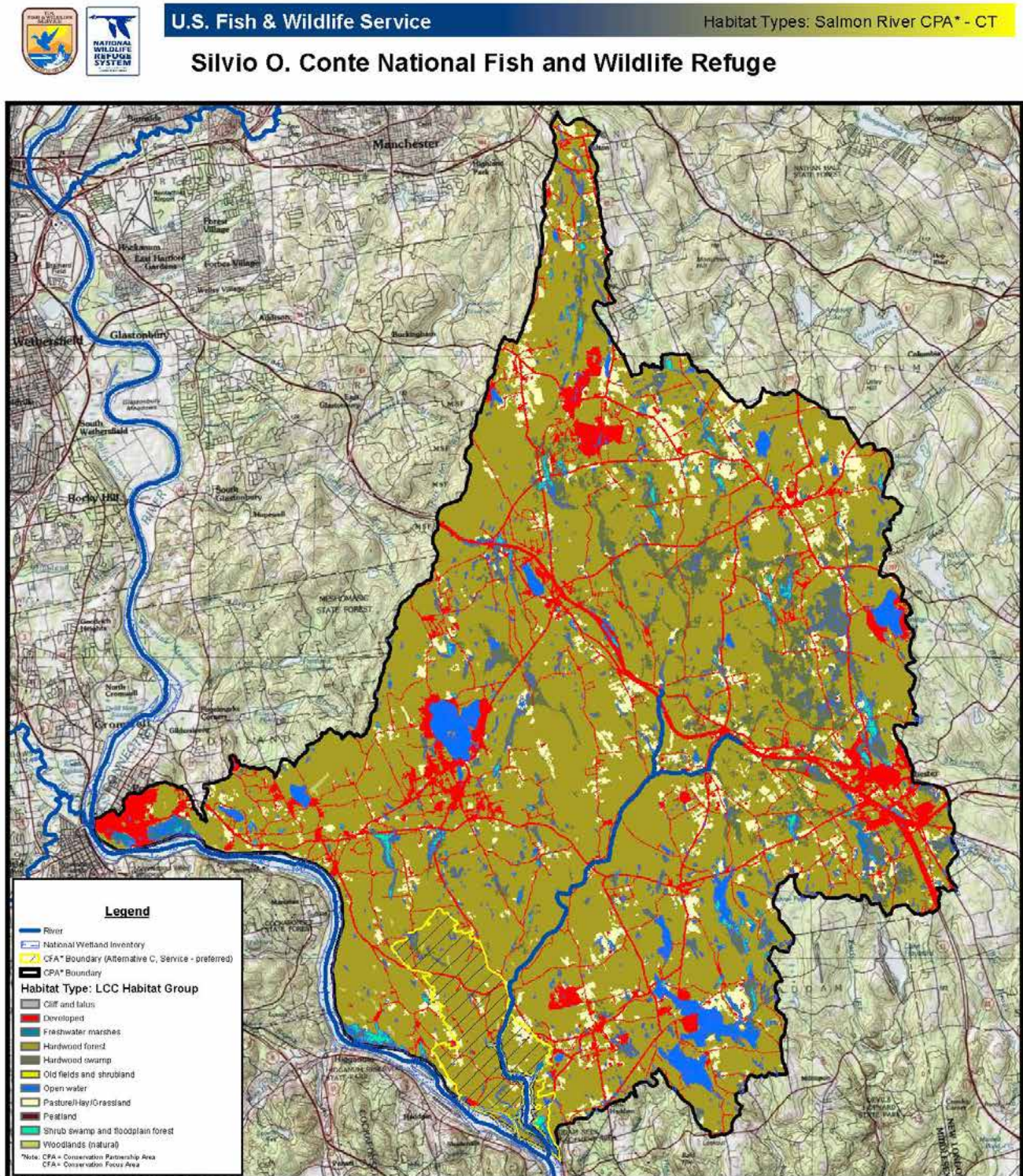


Table A.10. Salmon River CPA/CFA – Habitat Types.

LCC General Habitat Type ¹	CPA ²		CFA ³				Percent Habitat ⁸
	Total Acres	Percent of CPA ⁴	Total Acres	Conserved by Others ⁵	USFWS Owned ⁶	Percent CFA ⁷	
Forested Uplands and Wetlands ⁹							
Hardwood forest	71,722	68.5%	3,515	620	264	80.8%	4.9%
Hardwood swamp	9,064	8.7%	187	45	2	4.3%	2.1%
Shrub swamp and floodplain forest	1,091	1.0%	54	22	0	1.2%	5.0%
Woodlands (natural)	136	0.1%	23	0	4	0.5%	17.1%
Forested uplands and wetlands subtotal							
Non-forested Uplands and Wetlands ⁹							
Cliff and talus	26	0.0%	1	0	0	0.0%	4.2%
Freshwater marshes	581	0.6%	55	18	0	1.3%	9.4%
Old fields and shrubland	7	0.0%	7	6	0	0.2%	100.0%
Pasture/hay/grassland	7,378	7.0%	199	61	0	4.6%	2.7%
Peatland	1	0.0%	0	0	0	0.0%	0.0%
Non-forested uplands and wetlands subtotal							
Inland aquatic habitats ⁹							
Open Water	2,606	2.5%	46	9	1	1.1%	1.8%
Inland aquatic habitats subtotal							
Other							
Developed	12,070	11.5%	263	32	13	6.0%	2.2%
Other subtotal	12,070	11.5%	263	32	13	6.0%	2.2%
TOTAL	104,681	100.0%	4,349	813	284	100.0%	4.2%

**All acreages are based upon GIS analysis and should be considered estimates

1 - North Atlantic Landscape Conservation Collaborative general habitat typings for USFWS representative species; linked to the National Vegetation Classification System (NVCS). See table A.52 at the end of this appendix for a comparison of these generalized habitat types with the more specific The Nature Conservancy's Northeastern Terrestrial Habitat Classification System. More detailed habitat tables that include the Northeastern Terrestrial Habitat Classification System habitat types are available for each CFA and refuge unit online at: http://www.fws.gov/refuge/Silvio_O_Conte/what_we_do/conservation.html.

2 - Conservation Partnership Area

3 - Conservation Focus Area; representing Service - preferred Alternative C

4 - Percentage of the CPA represented by the habitat type

5- Acres in the CFA currently conserved by others (TNC 2012)

6 - Acres in the CFA currently owned by the USFWS

7 - Percentage of the CFA represented by the habitat type

8 - Percentage of a given habitat within the CPA protected within the CFA under Alternative C

9 - CCP Objective from Silvio O. Conte NFWR Draft CCP/EIS, Chapter 4, Alternative C-Service's Preferred Alternative

Table A.11. Salmon River CFA – Preliminary Priority Refuge Resources of Concern.

Priority Refuge Resources of Concern ¹	Habitat Structure ²	Associated Species ³
Forested Uplands and Wetlands⁴		
Hardwood Forest⁵ - 3,515 acres		
Wood Thrush^{A, B, C}	Breeding habitat includes contiguous mature forests (80+ years old) dominated by deciduous tree species, moist soils, a moderate to dense sub-canopy and shrub density, open forest floor and closed canopy (Roth et al. 1996, Rosenberg et al. 2003).	Eastern Towhee ^{A, I} Black-billed Cuckoo ^{I, J} Broad-winged hawk ^{A, I, J} Blue-winged Warbler ^{A, I} Great-crested Flycatcher ^{A, I} Hooded Warbler ^{I, J}
Louisiana Waterthrush^A	Breeding habitat includes contiguous (250+ acres) mature deciduous or mixedwood forests along medium to high-gradient, first to third-order, perennial streams (Mattsson et al. 2009, Degraaf et al., 2001).	Sharp-shinned Hawk ^{I, J} Yellow-throated Vireo ^{A, I, J} Eastern Red Bat^I Ovenbird^I American Woodcock ^{A, I} Gray Catbird ^{A, I, J}
New England Cottontail ^{B, D}	Year round habitat includes dense, young deciduous and mixed forests in patch sizes of 25 acres or more that are situated within 1 km of each other (Arbuthnot 2008, DeGraaf et al. 2001).	Eastern Box Turtle ^I Acadian Flycatcher ^{I, J} Scarlet Tanager ^{A, I, J} Black-and-white Warbler ^{A, I, J} Baltimore Oriole ^{A, I, J}
Blue-winged Warbler ^{A, B, I}	Breeding habitat includes fields scattered with shrubs and small trees, or young deciduous and mixed forests 1-20 years old (DeGraaf et al. 2001, Gill et al. 2001)	Prairie Warbler ^{A, I} Worm-eating Warbler ^{I, J} Northern Flicker ^{A, I, J} Cerulean Warbler ^{A, I, J} Ruffed Grouse ^I
Bald Eagle ^{C, G}	Breeding, migrating and wintering habitat includes large bodies of open water with little human disturbance, and large canopy trees or other elevated sites for nesting, perching, and roosting (DeGraaf et al. 2001).	Whip-poor-will ^{A, I} Chestnut-sided Warbler^I Migratory Species
Hardwood Swamp⁵ - 187 acres		
North-Central Appalachian acidic swamp ^H North-Central Interior and Appalachian rich swamp ^H	Eastern hemlock is usually present and may be dominant in the <i>North-Central Appalachian acidic swamp system</i> . It is often mixed with deciduous wetland trees such as red maple or black tupelo. Species of the genus <i>Sphagnum</i> are an important component of the moss layer. <i>North-Central Interior and Appalachian rich swamps</i> are found in basins where higher pH and/or nutrient levels are associated with a rich flora. Species include red maple, black ash (<i>Fraxinus nigra</i>), as well as calcium loving (calciphilic) herbs. Conifers include American larch, but typically not Northern white cedar, which is characteristic of more northern wetland systems. There may be shrubby or herbaceous openings within the primarily wooded cover. The substrate is primarily mineral soil, but there may be some peat development (Gawler 2008).	Uncommon plant community within the landscape that contributes to BIDEH*

Priority Refuge Resources of Concern ¹	Habitat Structure ²	Associated Species ³
Forested Uplands and Wetlands⁴		
Shrub Swamp and Floodplain Forest⁵ - 54 acres		
American Black Duck ^{A, B, C, G}	Migrating habitat includes herbaceous wetlands, fens, and flooded meadows and shrub-swamps (Longcore et al. 2000, DeGraaf et al. 2001).	American Redstart ^{I, J} Gray Catbird ^{A, I, J} Chestnut-sided Warbler ^I Migratory Species
New England Cottontail ^{B, D}	Year round habitat includes shrub swamps of at least 25 acres that are within 1 km of other shrub swamps, and early successional forest patches (Arbuthnot 2008, DeGraaf et al. 2001).	Willow Flycatcher^{A, I} American Woodcock ^{A, I} Rusty Blackbird ^A Warbling Vireo^I Spotted Turtle^I Eastern Kingbird ^{A, I, J}
Woodlands (natural)⁵ - 23 acres		
Central Appalachian pine-oak rocky woodland ^H	This system of the central Appalachians encompasses open or sparsely wooded hilltops and outcrops or rocky slopes. The substrate rock is granitic or of other acidic lithology. The vegetation is patchy, with woodland as well as open portions. Pine species are indicative and often are mixed with Oak species. Some areas have a fairly well-developed heath shrub layer, others a grass layer. Conditions are dry and nutrient-poor, and many, if not most, sites have a history of fire (Gawler 2008).	Uncommon plant community within the landscape that contributes to BIDEH*
Non-Forested Uplands and Wetlands⁴		
Freshwater Marshes⁵ - 55 acres		
American Black Duck ^{A, B, C, G}	Migrating habitat includes herbaceous wetlands, fens, and flooded meadows and shrub-swamps (Longcore et al. 2000, DeGraaf et al. 2001).	Northern Harrier ^{I, J} Wood Duck ^{A, I, J} Green-winged Teal ^{A, I, J} Snowy Egret ^{A, I, J} Great Blue Heron ^I Short-billed Dowitcher ^A Bufflehead ^A Canada Goose, NAP ^{A, J} Canada Goose, AP ^{A, J} Virginia Rail^I Marsh Wren^{A, I} Mallard ^{A, I, J} Lesser Yellowlegs ^{A, J}

Priority Refuge Resources of Concern ¹	Habitat Structure ²	Associated Species ³
Non-Forested Uplands and Wetlands⁴		
Old Fields and Shrublands⁵ - 7 acres		
New England Cottontail ^{B, D}	Year round habitat includes pastures, abandoned fields, and dense, young deciduous and mixed forests in patch sizes of 25 acres or more that are situated within 1 km of each other (Arbuthnot 2008, DeGraaf et al. 2001).	American Woodcock ^{A, I, J} Hognosed Snake ^I Eastern Towhee ^{A, I} Gray Catbird ^{A, I} Prairie Warbler ^{A, I}
Blue-winged Warbler^{A, B, I}	Breeding habitat includes fields scattered with shrubs and small trees, or young deciduous and mixed forests 1-20 years old (DeGraaf et al. 2001, Gill et al. 2001)	Brown Thrasher^{A, I} Field Sparrow^{A, I} Chimney Swift ^{A, I} Northern Harrier ^{I, J} Indigo Bunting ^{I, J} Migratory Species
Pasture/Hay/Grassland⁵ – 199 acres		
New England Cottontail ^{B, D}	Year-round habitat includes pastures, abandoned fields, and dense, young deciduous and mixed forests in patch sizes of 25 acres or more that are situated within 1 km of each other (Arbuthnot 2008, DeGraaf et al. 2001).	Bobolink^I Eastern Meadowlark^I Eastern Kingbird ^{A, I} Chimney Swift ^{A, I} Northern Harrier ^{I, J} Migratory Species
Cliff and Talus⁵ – 1 acre		
North-central Appalachian circum-neutral cliff and talus ^H	This cliff system occurs at low to mid elevations and consists of vertical or near-vertical cliffs and steep rocky slopes. Substrates include limestone, dolomite and other rocks. The vegetation varies from sparse to patches of small trees, in places forming woodland or even forest vegetation. Ash, basswood and American bladdernut are woody indicators of the enriched setting. The herb layer includes at least some species that are indicators of enriched conditions, e.g., yellow jewelweed, purple cliff-brake, ebony spleenwort, or bluntlobe cliff fern (Gawler 2008).	Uncommon plant community within the landscape that contributes to BIDEH*

Priority Refuge Resources of Concern ¹	Habitat Structure ²	Associated Species ³
Inland Aquatic Habitats⁴		
Water⁵ – 46 acres		
Alewife^{B, E, G}	Spawn in ponds and slow-moving streams (USFWS 1996).	Smallmouth Bass ^I Tidewater Mucket ^I Golden Club ^I Striped Bass ^I Longnose Dace ^I Yellow Perch ^I
Blueback Herring ^{F, G}	Spawn in fast moving, shallow water when the river temperature is about 58 F (USFWS 1996).	
American Eel^{E, F}	Migrating and feeding habitat includes lakes, streams and large rivers (USFWS 1996)	
Atlantic Salmon^{B, E, G}	Spawn in cold freshwater moving streams w/ coarse clean gravel and adequate food/cover. Migrate in large rivers (VTWAP 2005).	
Brook Floater ^E	Inhabits creeks and small rivers, prefers the stable bank conditions afforded by gravel or sandy substrates, and good water quality (Ned-eau et al. 2000).	
American Black Duck ^{A, B, C, G}	Migrating and wintering habitat includes open water, such as, estuaries, coves or bays with submerged aquatic vegetation, mollusks and crustaceans for foraging (DeGraaf et al. 2001).	Canada Goose, Atlantic ^A Canada Goose, North Atlantic ^A Bufflehead^A Mallard ^A Snowy Egret ^{A, I, J} Bald Eagle ^{A, I} Wood Duck ^A Green-winged Teal ^A

1 - These species of conservation concern and associated habitats, as well as under-represented and sensitive ecological systems constitute the management focus for the CFA, and recommended for the CPA. They were identified based on specific criteria, and are included in the following plans, databases and/or have Federal status.

A: 2008 Bird Conservation Region 30.

B: 2009 North Atlantic Landscape Conservation Cooperative Development and Operations Plan.

C: 2008 USFWS Birds of Conservation Concern.

D: Federal Threatened and Endangered status as of 2010, including Candidate Species

E: Federal Elevated Concern species or species petitioned for threatened and endangered listing as of 2010

F: 2009-2013 USFWS Northeast Region Fisheries Program Strategic Plan

G: Silvio O Conte Refuge Purpose Species.

H: 2008 Northeastern Terrestrial Habitat Classification System.

2 - This habitat structure will benefit the listed priority refuge resources of concern, and is based on the most recent literature.

3 - These species are a compilation from the following plans, and are associated with the habitat type and/or will benefit from all or a portion of the habitat structure associated with the priority species. This is not a comprehensive list of species.

A: 2008 Bird Conservation Region 30.

I: 2005 Connecticut Comprehensive Wildlife Conservation Strategy

J: 2012 Terrestrial and Wetland Representative Species of the North Atlantic: Species Selected, Considered, and Associated Habitats (Ecological Systems). These species were LCC candidate species and are represented by the selected LCC Representative Species.

4 - CCP Objectives from Silvio O. Conte NFWR Comprehensive Conservation Plan, Chapter 4, Service - preferred Alternative.

5 - These habitat types are based on the North Atlantic Landscape Conservation Cooperative (NALCC) habitat groupings for associated Representative Species, which were derived from The Northeastern Terrestrial Habitat Classification System (NETHCS). See table A.52 for a comparison of the NALCC habitat groupings and NETHCS.

BOLD - These species are LCC Representative Species, which is a species that, because of its habitat use, ecosystem function, or management response, typifies lifecycle or habitat requirements for a larger group of species.

* The Refuge Improvement Act directs the US Fish and Wildlife Service to maintain Biological Integrity, Diversity, and Environmental Health (BIDEH). Elements of BIDEH are represented by native fish, wildlife, plants and their habitats as well as those ecological processes that support them.

Goals, Objectives, and Strategies for Refuge Lands in the Salmon River CFA under Alternative C

Goal 1: Wildlife and Habitat Conservation: Promote the biological diversity, integrity, and resiliency of terrestrial and aquatic ecosystems within the Connecticut River watershed in an amount and distribution that sustains ecological function and supports healthy populations of native fish, wildlife, and plants, especially Federal trust species of conservation concern, in anticipation of the effects of climate, land use, and demographic changes.

Objective 1.1: Forested Uplands and Wetlands

Sub-objective 1.1a. (Hardwood Forest)

Improve the diversity of seral stages and (where and when possible) restore historic composition and structure, and improve landscape connectivity of hardwood forest habitat to support species of conservation concern and aid in climate change adaptation. Management will provide breeding and foraging habitat for priority refuge resources of concern, including wood thrush, Louisiana waterthrush, New England cottontail, blue-winged warbler and bald eagle.

Rationale:

We envision healthy forests within the Salmon River CFA where a diverse seral structure provides suitable breeding and post-breeding habitat conditions for a suite of Connecticut wildlife. Our long-term vision for the CFA includes hardwood forests characterized by complex horizontal and vertical structure, a generally closed canopy, large-diameter trees, dead woody material, snags and cavity trees, native species diversity, softwood inclusions, and a diversity of wildlife (Foster et al. 1996, Goodburn and Lorimer 1998, Keeton 2006, D'Amato et al. 2009, Curzon and Keeton 2010, Fraver et al. 2011).

Salmon River CFA hardwood forests provide a diversity of habitats for wildlife. To date our review of the Salmon River CFA habitats and wildlife species—and their condition—has been limited to coarse-scale information: the careful analysis of spatially-explicit habitat data using GIS, the consultation of local, state, and regional species conservation plans, and an understanding of forest disturbance and land-use history in New England. This allowed identification of broad habitat types, and species of conservation concern known to utilize characteristics common to these habitats. Our understanding of the forest structure within Salmon River comes exclusively from a reading of forest history in New England—a legacy of intensive past-use that altered the vegetation structure and composition, landscape patterns, and ongoing ecological dynamics (Cronon 1983, Whitney 1996, Foster et al. 1997, 2002, Bellemare et al. 2002). Our sub-objective assumes the forests of the Salmon River are more homogeneous than those of three centuries earlier, and include more sprouting and shade-intolerant species and fewer long-lived mature forest tree species (Goodburn and Lorimer 1998, Foster et al. 1998, Foster 2000, Bellemare et al. 2002, Cogbill et al. 2002, Abrams 2003). Completing a comprehensive forest and habitat inventory post-acquisition will test these assumptions, and aid in identifying stands where a forest management approach that combines passive management and the application of silvicultural treatments designed to emulate gap dynamics, will promote compositional and structural diversity, and move succession forward to emulate later seral stage characteristics.

For many species, the ability to survive and breed is often related to the presence of specific forest structural conditions or attributes, such as those that provide nest sites, food and foraging substrates, singing perches, and cover from predators. While our management goals may create a relatively old forest, hardwood forests within Salmon River will contain a variety of patches in different age classes and developmental stages; it will not be uniform throughout. This diversity of age classes provides a variety of species with a range of nesting and foraging opportunities. Further, finer-scale investigation of forest conditions may identify opportunities to improve age class diversity through the creation of early-successional forests—a habitat in decline in portions of the watershed. The Service's New England cottontail initiative has identified focus areas, including the Salmon River CFA, where the decline in early successional habitats is a particular problem for the New England cottontail. New England cottontail is petitioned for listing under the ESA, and is a species of greatest conservation need in Connecticut.

The conceptual model for the conservation of New England cottontail is for a focus area to contain at least 1,000 acres of early successional habitat of fifteen or more habitat patches, several of which are 25 acres or more. Each habitat patch should be one mile or less from each other to aid in New England cottontail movement between patches (Fuller and Tur 2012). Approximately 25 acres of forest will be managed in early successional habitat in support of New England cottontail in the CFA. Another species of conservation concern that will use these habitat patches is American woodcock. High quality woodcock habitat includes young forest patches within a mile of feeding areas. New England cotton tail habitat patches will be placed in the vicinity of shrub wetlands, where feasible, to benefit this species. If early successional habitat is lacking within the landscape, we will provide other strategically located patches with these conditions to support other species of conservation concern such as chestnut-sided warbler, gray catbird, eastern towhee, black and white warbler, blue-winged warbler, eastern red bat, and ruffed grouse (DeGraaf et al. 2006).

In a mature forest, many nesting bird species tend to remain within specific vegetation layers: on or near the ground, in the middle layer, or up in the canopy. Hardwood forests within the Salmon River CFA should have all forest layers present in moderate to high amounts distributed throughout a stand and across the landscape. Enhanced vertical structure will provide the greatest number of bird species with the greatest number of nesting and foraging opportunities. Patches of very dense native shrub and understory layers (0-5 feet in height) are of particular importance. These habitat elements may have importance to declining mature forest-interior species identified in regional conservation plans like wood thrush and Louisiana waterthrush. Wood thrush nest and feed at the ground level; a sub-canopy layer of shrubs, moist soils, and leaf litter are important habitat features (Roth et al. 1996, Rosenberg et al. 2003). Additionally, wood thrush has significance as a NALCC representative species for hardwood forests in the NALCC southern sub-region. Louisiana waterthrush prefer a dense, multilayer forest canopy — particularly along high-gradient streams — for protection from nest predation.

Our active forest management efforts will aim to create or maintain a canopy that is generally closed (>75-80% closure) with small gap openings scattered throughout a stand and the CFA. These openings will be caused by or mimic small, single- to few-tree disturbances and create opportunities for regenerating intermediate and shade-tolerant species. Regeneration in these openings will provide a continual supply of ephemeral nesting habitat for species like wood thrush. Efforts to regenerate a diversity of species must contend with evidence of reduced diversity or damage to tree seedlings and herbaceous plants attributed to white-tailed deer (Hough 1965, Anderson and Loucks 1979, Tilghman 1989, Rooney and Waller 2003, Côté et al. 2004, see also Rawinski 2008). The distribution and concentration of these openings will vary, but interior forest conditions will be maintained on the whole. Closed canopy conditions favor a suite of interior-nesting bird species that include: ovenbird, Acadian flycatcher, and — when along rocky bottomed streams — Louisiana waterthrush.

Efforts to maintain or improve seral stage diversity within the CFA will include the retention of large-diameter (24 inches or greater dbh) trees where appropriate. Such larger trees are either absent or are very few in younger forests, and that has implications for the habitat of wildlife species and for nutrient cycling. Structurally-sound, large-diameter trees are important nest sites for woodland raptors, such as the Sharp-shinned hawk. Emergent white pines—tall, large-diameter trees that extend above the canopy—provide special habitats that, when near open bodies of water, are utilized by bald eagles. Standing trees that are dead and/or contain cavities will be present in all size classes for those species, like black bear, that require large logs or trees for their dens (Wynne and Sherburne 1984, Chapin et al. 1997, DeGraaf and Yamasaki 2001). Snags and cavity trees also provide important nesting and foraging sites for bird species such as nuthatches, barred owls, and woodpeckers, like the northern flicker.

In 2011, an extensive inventory of invasive plants revealed populations of several species that could degrade habitats. The most abundant species are Japanese stiltgrass (mostly along Pine Brook riparian areas and other wetland types), Oriental bittersweet (mostly along the Salmon River riparian areas), and Japanese barberry and multiflora rose (mostly within forest interior). Garlic mustard is newer to the division, but has the potential to spread quickly. Local volunteers have been removing garlic mustard and Japanese stiltgrass to prevent their spread within the more pristine interior. Kudzu, one of the most prevalent invasive plants in the southeastern United States was found near the Salmon River Division; this is a very uncommon sighting in central Connecticut, and is of concern to state authorities.

Implementation of refuge strategies will begin with a comprehensive, multi-scale forest and wildlife habitat inventory. Forest wildlife species survival and breeding success is dependent not only on the habitat at the stand level, but also the surrounding landscape, making it necessary to consider the proportions and sizes of stand

types and successional stages within the CFA and the associated landscape. Baseline information on the condition of hardwood forests at the time of acquisition will further inform more detailed, stand-level habitat prescriptions within a required step-down HMP.

Management Strategies:

Within 5 years of land acquisition and CCP approval:

- Identify forest stands with late successional characteristics for passive management, and those where active management is necessary to improve forest structure. Appendix J provides general forest management guidelines, including descriptions of forestry techniques and explanations about how we will determine where and how to conduct active management.
- Develop an Integrated Pest Management Plan.
- Work with partners and adjacent landowners to identify areas appropriate for New England cottontail management. Plan to manage approximately 25 acres of forest in early successional habitat for New England cottontail in the CFA. This approximation of the amount and distribution of acreage over the next 15 years assumes we would have a large enough land base to manage. Our target acreage may also be refined once site conditions are verified and a habitat management plan is completed.
- Work with partners, including CTDEEP in support of the State Wildlife Action Plan, to ensure management on Service lands complements adjacent land management objectives.

Within 10 years of land acquisition and CCP approval:

- Implement identified active forest management opportunities using accepted silvicultural practices. Appendix J provides general forest management guidelines, including descriptions of forestry techniques and explanations about how we will determine where and how to conduct active management.
- Protect hard and soft mast producing species such as American beech inclusions, and apple and cherry trees, through the use of best management practices.
- Ensure a diversity of native species is present and non-native species are excluded or managed to keep population levels as low as possible. In particular, manage oriental bittersweet in riparian areas to protect the health of canopy trees that provide migratory bird habitat. Also, control kudzu if detected.
- Explore research opportunities with academic partners to address efficacy of forest management in meeting wildlife objectives.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Conduct forest and wildlife inventories.
- Map natural communities; protect rare or exemplary examples.
- Map vernal pools and seeps.

Sub-objective 1.1b. (Shrub Swamps and Floodplain Forests)

Manage shrub swamp and floodplain forest communities to support natural and rare ecological communities, and provide habitat for priority refuge resources of concern including American black duck and New England cottontail.

Rationale:

Shrub swamps are restricted to poorly drained areas, small seepage zones, and wide alluvial stretches of rivers and small streams. Shrubs tend to dominate the wetland, though grasses may be present. Typical species include willow, silky dogwood, speckled alder, white meadowsweet, bluejoint, tall sedge, and common rush (Gawler 2008). Our coarse-scale habitat analysis of this CFA identifies a wetland complex, consisting of shrub swamp and freshwater marsh communities, in the southeast portion of the CFA at the mouth of the Salmon River. This area is flooded during high water events, providing a diversity of plant communities, and habitats for a variety of wildlife species, including American black duck and, potentially, New England cottontail.

New England cottontail is a candidate species for listing under the Endangered Species Act, and is a species of greatest conservation need in Connecticut. The historic range of this species likely included southeastern New York, north through the Champlain Valley and into southern Vermont, New Hampshire and Maine, and statewide in Massachusetts, Connecticut, and Rhode Island. Due to loss of early successional habitat to development and forest maturation, this species occupies less than a fifth of its historical range (Fuller and Tur 2012). New England cottontail no longer exists at a sustainable population, and given this conservation urgency, a range-wide New England cottontail Initiative was established. This initiative involves collaboration from multiple agencies, including the USFWS, state wildlife agencies, Universities, Natural Resources Conservation Service, The Nature Conservancy, and Wildlife Management Institute, to address cottontail conservation on a landscape scale.

Focus areas were identified as locations to manage and restore habitat for New England cottontail. The Salmon River CFA was one of 49 focus areas in six states. Early successional management and protection of adjacent natural shrubland habitat, such as shrub swamps, will meet the conservation goals set for the New England cottontail. “A Conservation Strategy for the New England cottontail” was developed and approved in November 2012, and provides the conservation and habitat management goals and strategies for this species (Fuller and Tur 2012).

American black duck is a species of concern in the North American Waterfowl Management Plan because of historic population declines, and is listed as highest priority for conservation in BCR 30. Black ducks use wetlands, including shrub swamp communities, as stopover habitat during migration, and as breeding and wintering habitat. Well-concealed nests are placed on the ground in nearby uplands or hummocks in wetlands, and adults and their broods forage on seeds, aquatic vegetation, and invertebrates (Longcore et al. 2000, DeGraaf and Yamasaki 2001). Open water habitat and the adjacent wetland complex provide excellent wintering and migrating habitat for American black ducks. Given their location on the Connecticut River, an important migration corridor, these wetland communities are used by other waterfowl species during migration including green-winged teal, common merganser, mallards, bufflehead, and wood ducks.

Due to our lack of knowledge of the habitat conditions in the CFA, a comprehensive, multi-scale wildlife habitat inventory will be necessary. Wildlife species survival and breeding success is dependent not only on the habitat at a fine scale (shrub swamps), but also the surrounding landscape, making it necessary to look at the adjacent habitat conditions and land uses within the CFA and associated landscape. Baseline information on the condition of shrub swamps at the time of acquisition will further inform more detailed habitat prescriptions within a required step-down HMP.

Management Strategies:

Within 5 years of land acquisition and CCP approval:

- Minimize refuge activities that disturb wetland communities.
- If appropriate, incorporate shrub swamps into the network of habitat patches required for New England cottontail.
- Work with partners, including CTDEEP in support of the State Wildlife Action Plan, to ensure management on Service lands complement adjacent land management objectives.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Survey wildlife utilization of existing wetlands.
- Map natural communities; protect rare or exemplary examples.

Sub-objective 1.1c. (Biological Integrity, Biological Diversity, and Environmental Health)

Where and when appropriate, protect, or restore habitats absent an identified species of conservation concern, recognizing the importance of all habitats in contributing to the biological integrity, diversity, and environmental health of refuge lands and the Watershed.

Rationale:

Achieving the refuge purposes and the Refuge System mission are the paramount considerations for refuge management. Additionally, the Service has policy for maintaining and restoring, where appropriate, refuges’ “biological integrity, diversity, and environmental health” (601 FW 3). This policy provides refuge managers with

a process to analyze their refuge and recommend the best management direction to prevent further degradation of environmental conditions; and where appropriate, restore lost or severely degraded components. The policy suggests using historic conditions as a reference for comparing the ecosystem's current composition, structure, and functioning to what it was prior to substantial human related changes to the landscape. This comparison can be used to direct management to maintain or restore those natural conditions, to the extent practicable, without jeopardizing refuge purposes. For example, we consider the natural timing and frequency of disturbances, such as fires and flooding, and mimic those processes. In other words, the policy is intended to induce management for native fish, wildlife, and plants and their habitats in natural conditions, and with natural processes, using historic conditions to help identify such conditions and processes (Paveglio et al. 2010). However, we recognize that it is not always possible or desirable to try to mimic historic conditions, particularly in the face of predicted climate and land use changes and other landscape-scale considerations. Historic conditions are only one of many considerations when making decisions about how to manage refuge resources.

Conservationists often use the metaphor of coarse filters and fine filters to convey two complementary strategies for maintaining biological diversity, biological integrity, and environmental health: the first focuses on conserving ecosystems and the second focuses on species (Noss 1987, Hunter 1991, Groves 2003). The coarse-filter approach seeks to protect a representative array of natural ecosystems and their constituent processes, structures, and species (the refuge); however, some species fall through its pores, and coarse filters must be complemented by fine filter strategies tailored to fit particular species (priority species of concern). Sub-objectives throughout this plan generally represent a fine-filter approach—identifying species and their habitats that the USFWS has identified as priorities based upon our establishing legislation, refuge system mission, regional and national conservation plans, and conversations with conservation partners. In contrast, this sub-objective outlines CFA management that will benefit many of its species, the majority of which will not receive the special, tailored attention of fine-filter conservation. The BIDEH policy guidance complements coarse-filter conservation in ways that fine-filter conservation misses.

The key idea of BIDEH conservation is that most ecosystems contain certain features that are critical to the welfare of many species; thus, conserving those features can have a positive effect on a large suite of species (biological diversity). Logs in a forest, hedgerows in an agricultural landscape, and streams and pools in many terrestrial ecosystems are all examples of ecosystem features that support far more species than one would predict based on their size alone. The importance of conserving these features is widely recognized, but in an ad hoc, idiosyncratic fashion that often does not recognize the commonality between maintaining a hedgerow, a rock outcrop, and an herbaceous wetland. BIDEH conservation overlaps with many aspects of matrix management and ecosystem management (Lindenmayer and Franklin 2002). A key difference is its specific focus on ecosystem elements, which explicitly complements coarse-filter and fine-filter conservation.

Habitats that occur within the Salmon River CFA where species-specific management guidelines are not identified will be managed under the umbrella BIDEH policy. These habitats are most often small or isolated occurrences, but are important in maintaining connectivity within the larger forested matrix, and providing additional structural and species diversity to the matrix. Rocky outcrops and upland meadows, for instance, are anomalies in an otherwise forested landscape. They often have a special flora and fauna—providing sunny, dry sites for reptiles to bask, or nectar producing flowers for foraging butterflies. One could make the case that these outcrops are small, independent ecosystems, but they are really too small to be candidates for a classic coarse-filter strategy and thus best considered in a BIDEH context. This approach will allow the conservation of large numbers of species, the majority of which are too poorly known to be conserved individually (e.g., imagine species conservation plans for particular insects or liverworts). Together, the multiple strategies are reasonably comprehensive because all species and habitats known to be in jeopardy will receive needed attention.

The negative consequences of habitat loss and fragmentation to aspects of biological integrity, diversity and health have been shown by a large number of theoretical and empirical studies, in different environments, and for a large array of taxa (Fahrig 2003). Our understanding of the current condition of all the habitats considered under this sub-objective and their contribution to the BIDEH of the CFA is poor. A comprehensive forest and wildlife habitat inventory will be necessary to inform more detailed management strategies that provide the full range of natural processes.

Management Strategies:

Within 5 years of CCP approval:

- Work with partners, including the CTDEEP in support of the State Wildlife Action Plan, to ensure management on Service lands complement adjacent land management objectives.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Conduct habitat and wildlife inventories.
- Map natural communities; protect rare or exemplary examples.

Objective 1.2: Non-forested Uplands and Wetlands

Sub-objective 1.2a. (Freshwater Marsh)

Manage freshwater marshes to support natural and rare ecological communities, and provide breeding and foraging habitat for priority refuge resources of concern such as American black duck.

Rationale:

Freshwater marshes are often dominated by emergent and submergent herbaceous vegetation. Scattered shrubs are often present, and trees are generally absent. Herbaceous vegetation typically includes common bulrush, jewelweed, marsh fern, water lily and narrow-leaved cattail (Gawler 2008). Our coarse-scale habitat analysis of this CFA identifies freshwater marsh habitat at the mouth of the Salmon and Moodus Rivers.

The wetland complex located at the mouth of the Salmon River is discussed above as it consists of shrub swamp communities, as well as freshwater marsh communities. The wetland at the mouth of Moodus River is a large freshwater marsh that is adjacent to tidal flats in the Salmon River. The marsh vegetation in this wetland complex includes wild rice, a nutritious food source for waterfowl. Both locations provide excellent stopover habitat during migration, and breeding and wintering habitat for American black duck, and other waterfowl species. Please see sub-objective 1.1b for species specific details.

Due to our lack of knowledge of the habitat conditions in the CFA, a comprehensive, multi-scale wildlife habitat inventory will be necessary. Wildlife species survival and breeding success is dependent not only on the habitat at a fine scale (freshwater marsh), but also the surrounding landscape, making it necessary to look at the adjacent habitat conditions and land uses within the CFA. Baseline information on the condition of freshwater marsh habitat at the time of acquisition will further inform more detailed habitat prescriptions within a required step-down HMP.

Management Strategies:

Within 5 years of land acquisition and CCP approval:

- Evaluate wetland hydrology for impacts to natural flow regimes.
- Continue to control invasive water chestnut in marshes.
- Work with partners, including CTDEEP in support of the State Wildlife Action Plan, to ensure management on Service lands complement adjacent land management objectives.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Inventory wetland plant communities.
- Maintain current and increase native wild rice population.
- Survey wildlife use of wetlands.
- Map natural communities; protect rare or exemplary examples.

Sub-objective 1.2b. (Pasture/Hay/Grassland and Old Fields and Shrublands)

Provide appropriate conditions within current pasture, hay, and grassland acreage, and old field and shrubland habitat that will support New England cottontail (where appropriate), and other shrub-dependent conservation concern species such as blue-winged warbler. Also maintain large contiguous tracts of grassland habitat, if present and appropriate.

Rationale:

Over four percent of the Salmon River CFA is typed as pasture, hay, grassland, old fields and shrublands. These habitat types require active manipulation to inhibit the natural succession of converting to forest. The pasture, hay, and grassland habitats tend to be dominated by grasses, while shrubs dominate shrublands, and a mixture of shrubs and grasses tend to occur in old fields.

Many bird species of conservation concern rely on these habitats, including grassland dependent species such as bobolink and grasshopper sparrow, and shrub dependent species such as blue-winged warbler, prairie warbler, field sparrow, American woodcock, and chestnut-sided warbler. Many shrubland bird breeding populations occur in high proportions in the northeast, and therefore, are species of conservation responsibility (Dettmers, Randy 2003). While there is evidence that southern New England supported a small but significant grassland bird community before European settlement, only a small proportion of grassland breeding bird populations occur in the northeast (Dettmers and Rosenberg 2000). Maintaining high quality shrubland habitat in this CFA will provide habitat for a higher percentage of species in decline. However, large and contiguous grasslands are rare in the watershed, and large grassland habitat patches are important to high priority grassland species and overall biological diversity. We will maintain large grassland patches (e.g. 500 acres), or areas where a high proportion of grassland cover is present in the landscape (e.g., a mosaic of many medium to large patches).

Another species of conservation concern that uses shrubland dominated habitat is New England cottontail. This species is New England cottontail is petitioned for listing under the ESA, and is a species of greatest conservation need in Connecticut. The Salmon River CFA is a New England cottontail Focus Area, which are areas identified as locations to manage and restore habitat for New England cottontail. New England cottontail require early successional habitat (dense shrubs and tree saplings), and the pastures, hay fields, grasslands, shrublands and old fields in the CFA will provide this habitat with very little initial manipulation.

The conceptual model for the conservation of New England cottontail is for a focus area to contain at least 1,000 acres of early successional habitat of fifteen or more habitat patches, several of which are 25 acres or more. Each habitat patch should be one mile or less from each other to aid in New England cottontail movement between patches (Fuller and Tur 2012). Where appropriate and suitable, pastures, hay fields, grasslands, shrublands, and old fields will be incorporated into the network of patches managed for New England cottontail by allowing woody stem colonization.

Shrubland dominated habitats in the northeast support many species of conservation concern, many of which are a high conservation responsibility for the region, indicating the importance of shrubland habitats to these species in the CFA. Large, contiguous grassland habitats are also important to a suite of priority grassland bird species. Current pasture, hay, grassland, old fields and shrubland acres can provide quality habitat if managed appropriately. Baseline information on the condition of these habitats and association with other landscape features will further inform more detailed habitat prescriptions within a required step-down HMP.

Management Strategies:

Within 5 years of land acquisition and CCP approval:

- Work with partners to protect and promote farming practices (e.g. haying and pasture of animals) that benefit wildlife and protect water quality.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Conduct an inventory of these habitats to determine their condition, size and location, which will inform and prioritize appropriate management strategies in the HMP.

Sub-objective 1.2c. (Biological Integrity, Biological Diversity, and Environmental Health)

Where a focal species has not been identified, protect and restore habitats that contribute to the biological integrity, diversity, and environmental health of refuge lands and the Connecticut River watershed.

Rationale:

See rationale for sub-objective 1.1c.

Habitats that occur within the Salmon River CFA where species-specific management guidelines are not identified will be managed under the umbrella BIDEH policy. These habitats are most often small or isolated

occurrences, but are important in maintaining connectivity within the larger forested matrix, and providing additional structural and species diversity to the matrix. Rocky outcrops and upland meadows, for instance, are anomalies in an otherwise forested landscape. They often have a special flora and fauna—providing sunny, dry sites for reptiles to bask, or nectar producing flowers for foraging butterflies. One could make the case that these outcrops are small, independent ecosystems, but they are really too small to be candidates for a classic coarse-filter strategy and thus best considered in a BIDEH context. This approach will allow the conservation of large numbers of species, the majority of which are too poorly known to be conserved individually (e.g., imagine species conservation plans for particular insects or liverworts). Together, the multiple strategies are reasonably comprehensive because all species and habitats known to be in jeopardy will receive needed attention.

The negative consequences of habitat loss and fragmentation to aspects of biological integrity, diversity and health have been shown by a large number of theoretical and empirical studies, in different environments, and for a large array of taxa (Fahrig 2003). Our understanding of the current condition of all the habitats considered under this sub-objective and their contribution to the BIDEH of the CFA is poor. A comprehensive forest and wildlife habitat inventory will be necessary to inform more detailed management strategies that provide the full range of natural processes.

Management Strategies:

Within 5 years of CCP approval:

- Work with partners, including CTDEEP in support of the State Wildlife Action Plan, to ensure management on Service lands complement adjacent land management objectives.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Conduct habitat and wildlife inventories.
- Map natural communities; protect rare or exemplary examples.

Objective 1.3: Inland Aquatic Habitats

Sub-objective 1.3a. (Open Water)

In collaboration with partners, identify and implement habitat restoration opportunities within the Salmon River CFA to benefit priority refuge resources of concern including American eel, alewife, blueback herring, Atlantic salmon, and brook floater; as well as other species of conservation concern such as sea lamprey. Also provide undisturbed wintering and stopover habitat for American black duck, and other waterfowl.

Rationale:

The Salmon River and two of its tributaries, Pine Brook, and Moodus River are important aquatic ecosystems in the CFA. The Salmon River is still stocked with juvenile Atlantic salmon as part of the CT DEEP's Atlantic Salmon Legacy Program. Along with the Farmington River, it is the only place in the US where wild Atlantic salmon are present outside of Maine. Most of the Salmon River watershed (including upstream of the proposed CFA) is open to migratory aquatic species passage due to the Leesville Dam Fish-way, and other fish-way and dam removal projects. Pine Brook is also remarkable fish habitat; this brook's former dams have washed out and migratory fish have access to their full historic habitat up to a natural falls about two miles upstream of the mouth. Pine Brook also provides spawning habitat for Adult Atlantic salmon. Furthermore, it is one of very few places in Connecticut where the head of tide is located in an undeveloped area and not subjected to intense sport and commercial fisheries.

The Salmon River is important migratory habitat for Atlantic salmon, American shad, and spawning habitat for river herring. American eel, a species petitioned for federal listing, spend the majority of their young life in the freshwater systems of this CFA. American eel enter the Connecticut River as juveniles, and migrate upstream to inhabit bays, estuaries, streams, lakes, and ponds. Eels feed in these aquatic habitats until they reach sexual maturity and begin the long migration to their spawning grounds in the Sargasso Sea (ASMFC 2000). The Salmon River CFA also provides important aquatic habitat for freshwater mussels, including brook floater, a species petitioned for Federal listing.

Another species of conservation concern that utilize freshwater aquatic habitats in this CFA is sea lamprey. Sea lamprey enter the Connecticut River and tributaries to reproduce, and in the process provide important ecological benefits to aquatic systems. Adults transport nutrients between freshwater and saltwater systems,

their nest construction restores and enhances streambed structure, abandoned nests are used by other riverine fish, and lamprey eggs and larvae provide food for a variety of species (Kircheis 2004). As with many riverine fish, sea lamprey movement is impeded by barriers on the main stem and tributaries.

The open water habitat within the Salmon River, Connecticut River mainstem and wetlands provide excellent wintering and stopover habitat for American black duck. Other migratory waterfowl also take advantage of these secluded areas including green-winged teal, common merganser, mallards, bufflehead and wood ducks.

The aquatic habitats in the Salmon River CFA are diverse, and provide habitat for a variety of wildlife species. Development and human activities have impacted water quality and infringed on aquatic species movements and life cycles. We will work with partners to analyze current available data, and conduct additional assessments, as needed, to inform more detailed management and monitoring strategies within a required step-down HMP.

Management Strategies:

Within 10 years of land acquisition and CCP approval:

- Work with partners to protect and increase “hard bottom” (e.g., gravel, cobble, or bedrock) for spawning aquatic species.
- Work with partners to reduce combined sewer overflow.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Work with partners to conduct stream assessments to evaluate stream and fish community health.

Objective 1.4: Coastal Non-forested Uplands (coastal beaches and rocky shores)

Not applicable

Objective 1.5: Coastal Wetlands and Aquatic Habitats (tidal salt marsh and estuary)

Not applicable

Goal 2: Education, Interpretation, and Outreach: Inspire residents and visitors to actively participate in the conservation and stewardship of the exceptional natural and cultural resources in the Connecticut River watershed, and promote a greater understanding and appreciation of the role of the Silvio O. Conte National Fish and Wildlife Refuge in conserving those resources.

Objective 2.1: Environmental Education

In collaboration with public and private educators from all four states in the watershed, lead or facilitate the implementation of structured natural and cultural resource curricula, with a focus on guiding educators and students to develop an awareness of, and concern about, natural and cultural resources and associated challenges; appreciate our conservation history; make informed decisions and work individually or collectively toward solutions; and model responsible environmental stewardship in their everyday lives.

Sub-objective 2.1a. (Environmental Education Planning and Training)

Encourage schools, scout groups, and summer camps to develop curricula that use the Salmon River Division as an outdoor classroom.

Rationale:

See environmental education rationale in chapter 4 detailing the importance of environmental education for the Service. Environmental education is one of the six priority, wildlife-dependent recreational uses of the Refuge System. Environmental education is particularly important at Conte Refuge because one of its founding purposes

is to provide opportunities for environmental education. Environmental education is an important tool that can help refuge visitors and local residents, particularly students, appreciate the importance of this area to the larger watershed.

Management Strategies:

Within 1 year of acquiring sufficient land:

- Encourage schools, scout groups, and summer camps to develop curricula that use the Salmon River Division as an outdoor classroom.

Sub-objective 2.1b. (Environmental Education Delivery)

Encourage schools, scout groups, and summer camps to use the Salmon River Division as an outdoor classroom.

Rationale:

Because this division will be unstaffed, the majority of environmental education opportunities on this division will be led by partners, volunteers, and local school groups and other educational groups (e.g., scout groups and summer camps).

Management Strategies:

Within 1 year of acquiring sufficient land:

- Encourage schools, scout groups, and summer camps to develop curricula that use the Salmon River Division as an outdoor classroom.

Objective 2.2: Interpretation

Develop, lead, and facilitate interpretive programs that emotionally and intellectually connect the audience to natural and cultural resources in the watershed.

Sub-objective 2.2a. (Natural and Cultural Resource Interpretive Planning and Training)

With Friends groups, public and non-profit organizations, and volunteers, offer quality interpretive programming at the Salmon River Division. The development of highly trained interpreters will be encouraged by offering interpretive training to Friends' members, partners, and volunteers on a regular basis.

Rationale:

See the rationale in chapter 4 detailing the importance of interpretation for the Service. Interpretation is an important tool that can help refuge visitors and local residents appreciate the importance of this area to the larger watershed. With an ADA-compliant trail planned for the site, the Salmon River Division will be well suited to support both self-guided, wildlife dependent interpretive experiences, as well as guided interpretive programs that convey messages about the refuge and about the Salmon River Division's habitats and cultural resources.

Management Strategies:

(These strategies are dependent on land acquisition from willing landowners.)

Within 5 years of acquiring sufficient land:

- Inventory and evaluate each CFA to determine the appropriate interpretive materials to employ.
- Create meaningful, consistent, thematic statements about natural and cultural resources to be used in the delivery of programming at the Salmon River Division.
- Provide resources and trainings to Friends, and volunteers in support of interpretive programs.
- Work with regional cultural resources staff to develop interpretive messages about the historical importance of Venture Smith and his property.

Within 10 years of acquiring sufficient land:

- Develop standardized self-guided interpretive services, such as interpretive trails and kiosks, exhibits, and printed media.
- Employ a variety of themed interpretive offerings (e.g., presentations, audio-visual programs, brochures, and exhibits) when creating programming for natural and cultural resource interpretation.

- Make Certified Interpretive Guide (NAI) training available once every other year for refuge personnel, Friends Group members and the general public, with priority given to refuge affiliates.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Build an evaluation process that includes formal and informal evaluation to assess the effectiveness of all interpretation programs.

Sub-objective 2.2b. (Natural and Cultural Resource Interpretive Program Delivery)

Collaborate with Friends group, partners, and volunteers to deliver quality natural and cultural resource interpretive programs.

Rationale:

See the rationale for sub-objective 2.2a.

Management Strategies:

(These strategies are dependent on land acquisition from willing landowners.)

Within 5 years of acquiring sufficient land:

- Through partners, and Friends group, annually provide quality interpretive programs, exhibits, printed media at the Salmon River Division. Interpretive programs would cover both natural and cultural resource themes, including the importance of Venture Smith and his property.
- Incorporate thematic statements, measureable objectives, and evaluation measures into all interpretation efforts.
- Publicize interpretive programs through traditional media, on the refuge web site, and digital social media conduits.
- Maintain a supply of print interpretive brochures, i.e., general brochure and bird checklist that incorporate refuge interpretive messages and themes.
- Work with partners to create issue-oriented experiential activities and programs for use at their facilities.

Within 10 years of acquiring sufficient land:

- Contribute refuge interpretive information for scenic byways and other state publications and signs.
- Develop self-guided interpretive messages and use state of the art as well as traditional media e.g. pamphlets, signs, etc.

Objective 2.3: Public and Community Outreach

Support, promote, and coordinate a wide range of outreach tools and activities to facilitate and improve communications and relationships with the American public, especially communities, adjacent landowners, and elected officials in the Connecticut River watershed, and to empower citizens to recognize and resolve local natural resource issues and promote conservation and the responsible use of natural resources.

Because the Salmon River Division would be unstaffed and does not have refuge facilities, public and community outreach for this site will occur through regular outreach activities at the headquarters and will not specifically occur at this site.

Objective 2.4: Science and Technical Outreach

Facilitate the collection and exchange of information that increases the knowledge and understanding of natural and cultural resources, addresses climate change and other conservation issues, and provides land managers with better information to make management decisions affecting resources.

Because the Salmon River Division would be unstaffed and does not have refuge facilities, science and technical outreach for this site will occur through regular outreach activities at the headquarters and will not specifically occur at this site.

Goal 3: Recreation: Promote high-quality, public recreational opportunities in the Connecticut River watershed that are complementary between ownerships and provide regional linkages with emphasis on promoting wildlife-dependent activities that connect people with nature.

Objective 3.1: Hunting

Support quality public hunting opportunities in the Connecticut River watershed to promote a unique understanding and appreciation of natural resources and their management on lands and waters, while also protecting a traditional outdoor pastime deeply rooted in America's natural heritage and conservation history.

Sub-objective 3.1a. (Hunting Opportunity, Access, and Infrastructure)

Provide the opportunity for a quality hunting experience based on state regulations.

Rationale:

Hunting is allowed on national wildlife refuges, as long as it is found to be a compatible use. Under Service ownership, the division south of State Highway 151 has been open to hunting, excluding safety zones around buildings, under a pre-acquisition compatibility determination. In partnership with the Connecticut Department of Energy and Environmental Protection, hunting regulations follow that of nearby state-owned lands. Prior to Service acquisition, hunting was allowed through a lottery system administered by The Nature Conservancy. Retaining hunting opportunities at this division conforms to historic use on this property and much of the surrounding land in the area. Principal game species include white-tailed deer, Eastern wild turkey, and cottontail rabbits.

Management Strategies:

Continue to:

- Allow hunter access to the refuge outside of the normal division open hours (i.e. 30 minutes before sunrise and 30 minutes after sunset) as long as they are engaged in lawful hunting activities.
- Post newly acquired properties to ensure refuge boundary lines are clearly marked.
- Allow temporary tree stands and blinds that meet state hunting regulations and do not harm trees or other refuge vegetation. Tree stands and blinds must have the owner's name and phone number clearly displayed, and they must be removed at the end of the hunt season.

Within 1 year of CCP approval:

- Complete all administrative requirements to maintain hunting consistent with State hunting regulations and, if necessary, additional refuge-specific regulations.
- Post newly acquired properties to ensure refuge boundary lines are discernable.
- Open newly acquired lands to hunting, if found to be compatible.
- Consult with Connecticut Department of Energy and Environmental Protection, Hunting Review Team in evaluating the suitability of new acquisitions to support a safe, manageable hunt program.
- Install an informational kiosk in a conspicuous location to post information on hunting seasons and other notices to visitors.

Within 5 years of CCP approval:

- Work with Connecticut Department of Energy and Environmental Protection to determine whether opportunities exist for state-recognized disabled hunters.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Work with Connecticut Department of Energy and Environmental Protection to evaluate the effectiveness and success of the refuge hunt program in contributing to state population objectives.

Sub-objective 3.1b. (Hunter Education and Outreach)

Provide hunter education classes access to the division and conduct directed outreach to ensure hunters are informed about regulations, hunter ethics, and safety considerations. Develop programs, including brochures, signage, website pages, media releases, etc. to increase interest in hunting at the division.

Rationale:

Hunting is a priority public use that also serves as a population management tool. Providing hunter education instructors the opportunity to use the division with their classes will strengthen connections to the hunting community and student understanding of the role hunting plays in wildlife management. Making relevant information readily available to hunters through a variety of media will improve the quality of the hunting experience.

Management Strategies:

Within 1 year of CCP approval:

- Produce a hunt brochure that includes information on regulations, hunter ethics, safety considerations, etc. and make it available on the refuge website, at Salmon River Division kiosks, through a friends group, and in local businesses.
- Provide visitors with general information on the hunting program and refuge-specific and State regulations through the refuge website, information signs, and a hunting brochure. In all materials related to the hunting program, promote and encourage the use of lead-free ammunition.
- Work with the State to identify and evaluate the impacts associated with requiring the use of non-toxic ammunition for hunting on refuge lands.

Within 5 years of CCP approval:

- Work with Connecticut Department of Energy and Environmental Protection to encourage youth hunting at the division as a means of introducing young people to this traditional recreation activity.
- Offer to host hunter education field courses.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Develop a system to monitor and evaluate the hunting program with hunters and other users to determine if the objective is being met and to allow for adaptive management.

Objective 3.2: Fishing

Support quality, public fishing opportunities in the Connecticut River watershed to promote an understanding and appreciation of natural resources and their management on lands and waters, while also protecting a traditional outdoor pastime deeply rooted in the America's natural heritage and conservation history.

Sub-objective 3.2a. (Fishing Opportunities, Access, and Infrastructure)

Provide the opportunity for a quality fishing experience based on Connecticut Department of Energy and Environmental Protection regulations, and division-specific conditions, if necessary.

Rationale:

Fishing is a priority public use on national wildlife refuges and a popular outdoor recreational activity. The division has been open to fishing, following acquisitions, through pre-acquisition compatibility determinations, but no formal opening package or fishing plan has been completed. Fishing opportunities on the division are currently limited to sections of the Salmon River and Pine Brook. Both support game fish populations.

Management Strategies:

Within 1 year of CCP approval:

- Complete all administrative requirements to maintain fishing consistent with State hunting regulations and, if necessary, additional refuge-specific regulations.
- Post newly acquired properties to ensure refuge boundary lines are discernable.
- Install an informational kiosk in a conspicuous location to post information on fishing seasons and other notices to visitors.
- The Salmon River Division would be open to visitors actively engaged in fishing during the seasons and times established by the state in their annual fishing regulations.

Within 5 years of CCP approval:

- Work with the Connecticut Department of Energy and Environmental Protection to inventory and assess fish populations on the division.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

Develop a system to monitor and evaluate the fishing program with anglers and other users to determine the objective is being met and to allow for adaptive management.

Sub-objective 3.2b. (Angler Education and Outreach)

Develop programs, including brochures, signage, website pages, media releases, etc. to inform visitors of fishing opportunities at the division.

Rationale:

Although most dedicated anglers will be drawn to the nearby Connecticut River, the reaches of Salmon River and Pine Brook on the division do offer fishing opportunities. Visitors unaware of this available resource may choose to participate while on the division.

Management Strategies:

Within 1 year of CCP approval:

- Produce a fishing brochure that includes information on regulations, angler ethics, safety considerations, etc. and make it available on the refuge website, at informational kiosks, and in local businesses. In all materials related to the fishing program, promote use of lead-free tackle.

Objective 3.3: Wildlife Observation and Photography

Support quality, public opportunities to observe and photograph wildlife in the Connecticut River watershed in a variety of natural habitats to connect a broad spectrum of people with nature.

Sub-objective 3.3a. (Infrastructure and Access for Wildlife Observation and Photography)

Provide quality opportunities for wildlife observation and photography for people of all physical abilities.

Rationale:

Wildlife viewing and photography is a priority public use on national wildlife refuges and a popular recreational activity. Opening acquired land in this new division to wildlife observation and photography will provide visitors a chance to see and photograph a variety of wildlife species in their native habitats, while learning more about the Service, Refuge System, and the refuge.

Management Strategies:

Continue to:

- Allow public access from 30 minutes before sunrise to 30 minutes after sunset with the exception listed for hunters and anglers.
- Allow wildlife observation and photography at the Salmon River Division.

Within 1 year of CCP approval:

- Install an informational kiosk to post information on wildlife observation and photography opportunities, and other notices to visitors.

Within 10 years of CCP approval:

- Develop a public access strategy and required planning (i.e. NEPA, compatibility determination) that includes consideration of developed trails, parking, kiosks, viewing platforms, blinds, interpretation, signage, etc.

Within 15 years of acquiring land:

- Implement the visitor use enhancements identified in the public access strategy and the refuge Visitor Services Plan.

Sub-objective 3.3b. (Wildlife Observation and Photography Aids)

Offer viewing and photography aids that enhance the visitor experience. Use a variety of methods to reach a broad spectrum of people. Work closely with the friends group and other partners who host events designed to view wildlife on the division.

Rationale:

The open portions of the division would be available for wildlife observation and photography; however, there are steps the refuge can take to enhance the experience. By providing new visitors a quality experience they are more likely to return and share their experiences with others. One way to accomplish this is to offer sufficient information to attract a variety of visitors through a variety of media.

Management Strategies:

Within 1 year of CCP approval:

- Allow photography blinds that do not negatively impact wildlife behavior or conflict with other visitors. Blinds must be removed each day, unless arrangements have been made via a special use permit.

Within 5 years of CCP approval:

- Develop interpretive panels describing typical wildlife on the refuge, bird migration patterns, and other messages we want to convey to visitors.
- Sponsor wildlife observation events such as International Migratory Bird Day, the Big Sit, etc.
- Encourage local schools and groups and environmental organizations to offer wildlife-centered trips to the refuge.
- Produce a list of wildlife species and associated habitats and other conservation information on the division for distribution at informational kiosks, the refuge website, and other popular media.

Sub-objective 3.3c. (Watershed-based Partner Initiatives)

Not applicable

Objective 3.4: Other Recreational Activities

In order to reach a broader demographic, support non-priority outdoor recreational opportunities and public access to quality, nature-based experiences throughout the Connecticut River watershed that facilitate and improve community relationships, raise awareness and an appreciation for conserving natural resources, and garner support for the National Wildlife Refuge System.

Sub-objective 3.4a. (Regional Water-based Trail Initiatives and Opportunities Including Refuge Lands)

Develop compatible opportunities on the Salmon River Division that support regional water-based trail initiatives to connect people with nature, raise the visibility of the Service and the Refuge System, make the refuge more relevant to the local community, and to promote economic activity in the local area.

Rationale:

Regional water-based trails give individuals opportunities to engage in outdoor recreational opportunities in the Connecticut River watershed, such as fishing, boating, and wildlife observation. Examples include a Connecticut River waterway trail. Where appropriate, we will work with these partners to promote, and distribute information about, these opportunities.

Within 5 years of acquiring land with Connecticut River frontage:

- Work with public and private partners to determine whether and what roles this division might contribute to a Connecticut River waterway route.
- As lands are acquired, evaluate any water trails (e.g., canoe/kayak trails) that part of a regional or State network for their compatibility.

Sub-objective 3.4b. (Regional Land-based Trail Initiatives and Opportunities Including Refuge Lands)

Develop compatible opportunities on the Salmon River Division that support regional land-based trail initiatives to connect people with nature, raise the visibility of the Service and the Refuge System, make the refuge more relevant to the local community, and to promote economic activity in the local area.

Rationale:

Land-based trails give individuals opportunities to engage in outdoor recreational opportunities in the Connecticut River watershed, such as hiking, wildlife observation, and interpretation. Where appropriate, we will work with these partners to promote, and distribute information about, these opportunities.

Management Strategies:

Within 5 years of acquiring land:

- As lands are acquired, evaluate any existing trails (e.g., hiking trails, snowmobile trails, horseback riding trails) that part of an established regional or State network to determine if they are appropriate and compatible uses for the refuge.

Sub-objective 3.4c. (Other Appropriate and Compatible Recreational Opportunities That Enhance Visitor Use and Enjoyment of Refuge Lands)

Allow compatible outdoor recreational opportunities on the Salmon River Division that connect people with nature, raise the visibility of the Service and the Refuge System, make the refuge more relevant to the local community, and promote economic activity in the local area.

Rationale:

In addition to the priority public uses, there are other wildlife-dependent, appropriate and compatible recreational activities that can broaden the visitor base, giving people alternative ways to enjoy the natural resources at the division without detrimentally impacting the wildlife resource.

Management Strategies:

Within 1 year of CCP approval:

- Allow dispersed hiking, snowshoeing, and cross-country skiing.
- Allow pet walking. In order to minimize conflicts with wildlife and other visitors, pets must be on leashes not longer than 10 feet in length.
- Allow recreational gathering of blueberries, blackberries, strawberries, raspberries, mushrooms, fiddleheads, and antler sheds.
- When compatible, allow commercial guiding in support of priority public uses by special use permit.
- Allow bicycles on the Salmon River Road.
- Allow canoeing and kayaking in acquired coves and waterways.

Within 5 years of CCP approval:

- Work with friends groups and partners to design and market a virtual geocache course at the division. The course should integrate orienteering with refuge interpretive messages that include linking this division to other refuge divisions and units.

Overview Scantic Conservation Focus Area (Proposed)

Windsor, East Windsor, South Windsor, Hartford, and East Hartford, Connecticut

Conservation Focus Area (CFA)—Acreage Profile	Acres	Percentage of CFA
Total CFA Acres to be Conserved by Service	4,128	89.5 %
■ Existing Refuge Ownership in CFA ¹	0	
■ Additional Acres in CFA proposed for Refuge Acquisition ²	4,128	
Existing Acres in CFA Permanently Conserved by Others ^{2,3}	484	10.5 %
Total Acres in CFA ^{2,4}	4,612	100 %

¹Acres from Service's Realty program (surveyed acres); ²Acres calculated using GIS; ³The Service does not plan to acquire existing conserved lands, except under extenuating circumstances (conserved acres from TNC 2010 data); ⁴The Service would conserve up to this number of acres. The Service only acquires lands from willing sellers.

What specific criteria and/or considerations drove the selection of this CFA?

Scantic was a SFA in the 1995 Conte FEIS. The Scantic CFA area is considered important floodplain forest by The Nature Conservancy and the proposed CFA would allow for the restoration and conservation of the floodplain forest and associated wetland complex. Habitat conservation in this CFA will help allow for the landward migration of the coastal wetland complex (salt-, brackish-, and freshwater tidally influenced wetlands) due to climate change.

What are the priority habitat types within the proposed CFA? What percentage of the total CFA acreage do they represent?

- Pasture/Hay/Grassland – 30.3%
- Hardwood Swamp – 22.8%
- Freshwater Marsh – 6.1%

For more information on the habitats in the unit, see map A.14 and table A.12.

What are the resources of conservation concern for the proposed CFA?

As noted in table A.13 below, there are seven priority refuge resources of concern (PRRC) aquatic and terrestrial species that rely upon the open water and wetland habitats in this CFA. There are also habitat types that are not being managed for a particular PRRC species, but are important for their contribution to Biological Integrity Diversity and Environmental Health (BIDEH) of the landscape. This includes floodplain habitats which have undergone significant alteration within the Connecticut River watershed. The refuge will seek to protect and restore (if necessary) these, and other PRRC habitat types. Additionally, we recognize the value of this area to State Species of Greatest Conservation Need (SGCN) and migratory birds. These species and habitats are discussed further below.

1. Federal Threatened and Endangered Species

This section of the Connecticut River provides crucial spawning habitat for the federally listed shortnose sturgeon. This species is not known to spawn in any other sections or tributaries of the river in Connecticut. American eel, a species petitioned for listing, also occupy the main stem and tributaries within the Scantic CFA.

2. Migratory Birds

The Connecticut River watershed is a major migration corridor. The lower portion of the watershed (CT and MA) receives higher use by migrants, with this use concentrated in habitats along the Connecticut River main stem (Smith College 2006). The Scantic CFA is situated on the Connecticut River, and provides important stopover habitat for landbirds, shorebirds, and waterbirds.

3. Waterfowl

The freshwater marshes, hardwood swamps and open water of the Connecticut River provide important stopover areas for migrating and wintering waterfowl. Large concentrations of American black ducks (a PRRC species), green-wing teal, mallard, and American wigeon use habitats in this CFA. Other species include Canada geese, bufflehead, canvasback, wood duck, northern pintail, gadwall, and mergansers.

4. Diadromous fish and other aquatic species

The Scantic CFA straddles the Connecticut River, and is located at the mouth of the Podunk, Scantic, and Farmington Rivers. Many species of conservation concern use these aquatic habitats including PRRC species like American shad, shortnose sturgeon, American eel, alewife, blueback herring, and Atlantic salmon.

This section of the Connecticut River, and mentioned tributaries are important spawning habitat for shad, alewife, and blueback herring. The main stem also provides crucial spawning habitat for the federally listed shortnose sturgeon. This species is not known to spawn in any other sections or tributaries of the river in Connecticut. American eel also occupy the main stem and tributaries within the Scantic CFA. Sea lamprey, another species of conservation concern, occurs in this CFA providing important ecological benefits to aquatic systems.

5. Wetlands

The Scantic CFA contains a small portion of ecologically significant floodplain habitat (Marks et al 2011) located along the Connecticut River main stem extending from west side of the river from North Meadows of Hartford to Windsor and on the east side of the river from East Hartford almost to Enfield. The remnant patches of floodplain habitat in the Scantic River CFA are vulnerable to invasive species, especially habitats that flood infrequently. Opportunities may be available for floodplain restoration in areas where these habitats have been altered.

What habitat management activities would likely be a priority on refuge lands within the proposed CFA?

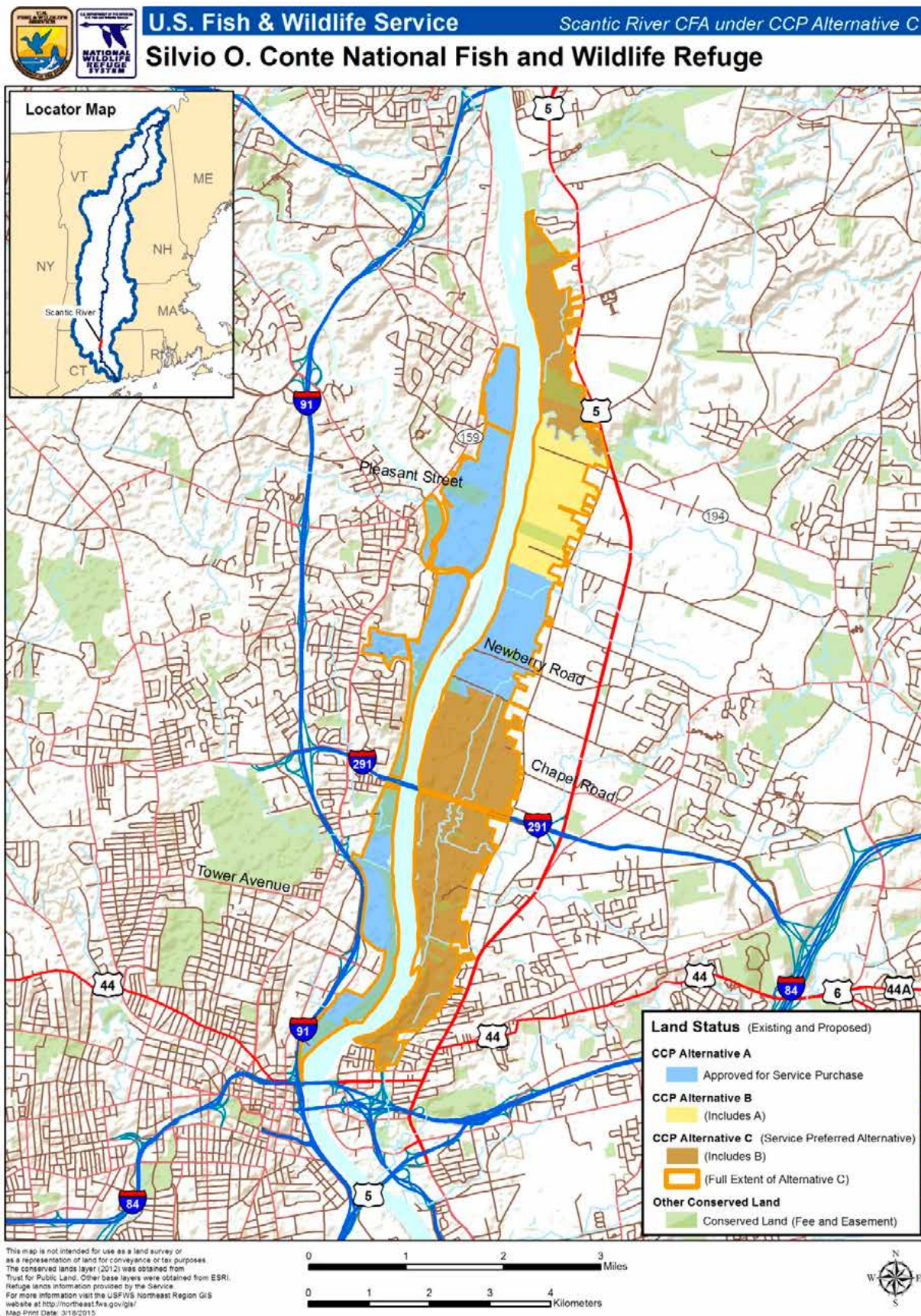
We will conduct a comprehensive, multi-scale wildlife habitat inventory following acquisition. Baseline information on the condition of habitats (i.e. forested, non-forested, and open water habitats) will further inform more detailed, habitat prescriptions within a required step-down Habitat Management Plan (HMP). Once the inventory has been completed, then management will focus on maintaining the following conditions:

- Forest management activities will focus on restoration of degraded floodplains, including restoring the primary natural disturbance mechanism (seasonal flooding) and species composition and structure to accepted historical conditions. Management of upland forests will also provide structurally diverse habitat dominated by species appropriate to site conditions and location.
- We will also manage emergent and shrub wetland habitats, and will focus on maintaining the natural hydrology and native species composition. Invasive plant management will be a priority.
- In open water (stream, rivers, and coves) habitats, we will focus on maintaining stream connectivity, establishing riparian buffers, and reducing run-off from the surrounding landscape.

What public use opportunities would likely be a priority on refuge lands within the proposed CFA?

When compatible, we would seek to provide recreational access to the river for priority public uses (hunting, fishing, wildlife observation and photography, interpretation, and environmental education) and for boating.

Map A.13. Scantic CFA – Location.



Map A.14. Scantic CFA – Habitat Types.

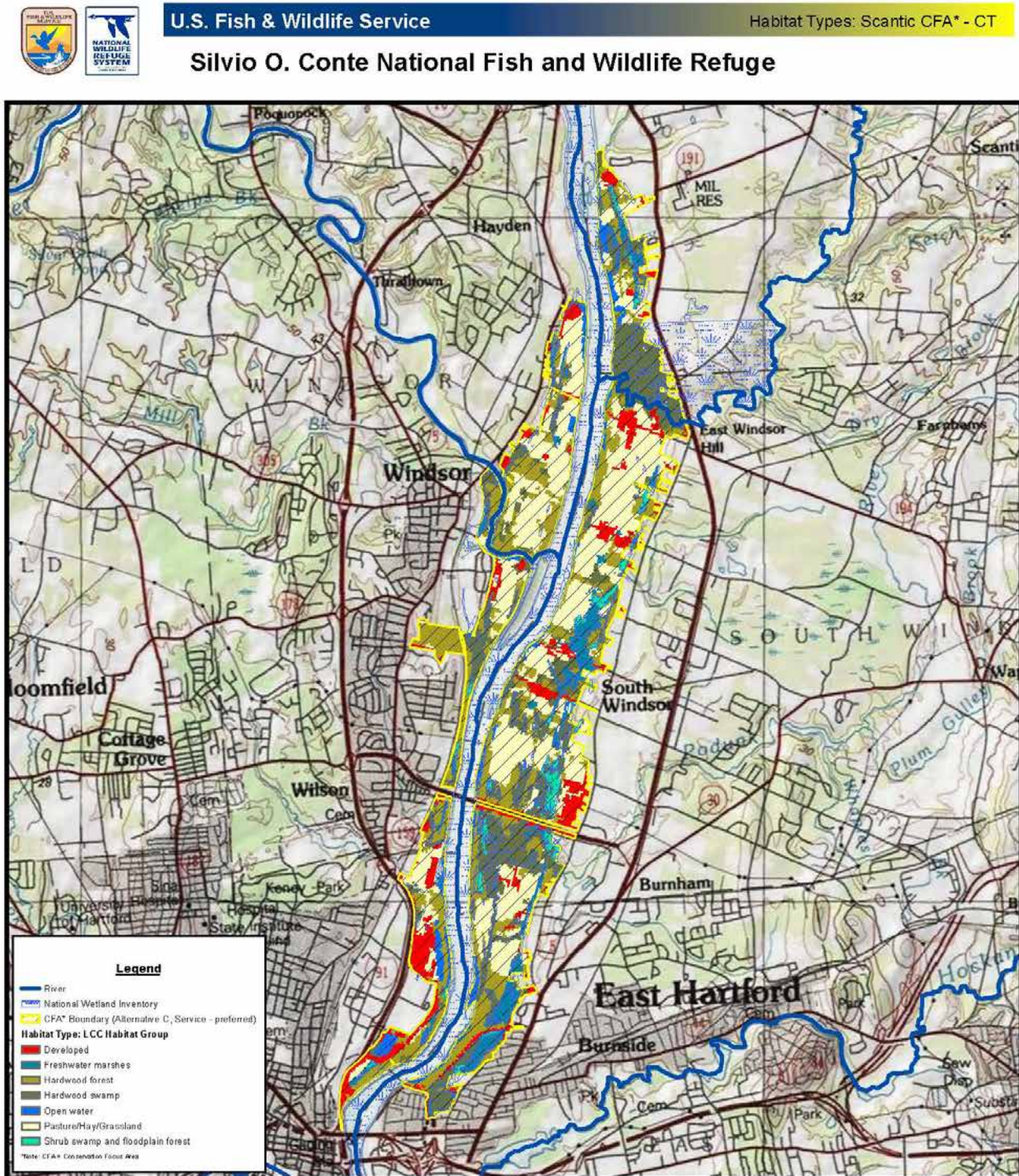


Table A.12. Scantic CFA – Habitat Types.

LCC General Habitat Type ¹	CFA ²			Percent CFA ⁵
	Total Acres	Conserved by Others ³	USFWS Owned ⁴	
Uplands and Wetlands ⁶				
Hardwood forest	1,074	228	0	23.3%
Hardwood swamp	1,049	106	0	22.8%
Shrubland swamp and floodplain forest	114	7	0	2.5%
Forested uplands and wetlands subtotal	2,238	341	0	48.6%
Non-forested Uplands and Wetlands ⁶				
Freshwater marshes	280	36	0	6.1%
Pasture/hay/grassland	1,393	38	0	30.3%
Non-forested uplands and wetlands subtotal	1,672	74	0	36.3%
Inland aquatic habitats ⁶				
Open Water	210	24	0	4.6%
Inland aquatic habitats subtotal	210	24	0	4.6%
Other				
Developed	483	45	0	10.5%
Other subtotal	483	45	0	10.5%
TOTAL	4,602	484	0	100.0%

**All acreages are based upon GIS analysis and should be considered estimates

1 - North Atlantic Landscape Conservation Collaborative general habitat typings for USFWS representative species; linked to the National Vegetation Classification System (NVCS). See table A.52 at the end of this appendix for a comparison of these generalized habitat types with the more specific The Nature Conservancy's Northeastern Terrestrial Habitat Classification System. More detailed habitat tables that include the Northeastern Terrestrial Habitat Classification System habitat types are available for each CFA and refuge unit online at: http://www.fws.gov/refuge/Silvio_O_Conte/what_we_do/conservation.html.

2 - Conservation Focus Area, representing Service - preferred Alternative C

3- Acres in the CFA currently conserved by others (TNC 2012)

4 - Acres in the CFA currently owned by the USFWS

5 - Percentage of the CFA represented by the habitat type

6 - CCP Objective from Silvio O. Conte NFWR Draft CCP/EIS, Chapter 4, Alternative C-Service's Preferred Alternative

Table A.13. Scantic CFA – Preliminary Priority Refuge Resources of Concern

Priority Refuge Resources of Concern ¹	Habitat Structure ²	Associated Species ³
Forested Uplands and Wetlands⁴		
Hardwood Forest⁵ - 1,074 acres		
Appalachian (hemlock)-northern hardwood forest ^H Northeastern interior dry-mesic oak forest ^H	Northern hardwoods such as sugar maple, yellow birch, and American beech are characteristic of the <i>Appalachian (hemlock)-northern hardwood forest</i> , either forming a deciduous canopy or mixed with eastern hemlock (or in some cases white pine). Other common and sometimes dominant trees include Oak spp. (most commonly red oak, tulip poplar, black cherry, and black birch. <i>Northeastern interior dry-mesic oak forests</i> are typically closed-canopy forests, though there may be areas of patchy-canopy woodlands. Soils are acidic and relatively infertile but not strongly drought prone. Oak species characteristic of dry-mesic conditions (e.g., red oak, white oak, black oak, and scarlet oak and hickory are dominant in mature stands. Chestnut oak may be present but is generally less important than the other oak species. American chestnut was a prominent tree before chestnut blight eradicated it as a canopy constituent. Red maple, black birch, and yellow birch may be common associates. With a long history of human habitation, many of the forests are early in their development following disturbance, where White pine, Virginia pine, or tulip poplar may be a dominant or codominant presence. On hills and slopes within these forests, pockets with impeded drainage may support small isolated wetlands, including non-forested seeps or forested wetlands with red maple, swamp white oak, or black tupelo characteristic (Gawler 2008).	Migratory species

Priority Refuge Resources of Concern ¹	Habitat Structure ²	Associated Species ³
Forested Uplands and Wetlands⁴		
Hardwood Swamp⁵ - 1,049 acres		
<p>North-Central Appalachian acidic swamp^H</p> <p>North-central interior wet flatwoods^H</p>	<p><i>North-Central Appalachian acidic swamps</i> are found in basins or on gently sloping seepage lowlands. The acidic substrate is mineral soil, often with a component of organic muck (organic matter 20 to 65 percent); if peat (greater than 65 percent organic material) is present, it usually forms an organic top soil horizon over mineral soil rather than a true peat substrate. Eastern hemlock is usually present and may be dominant. It is often mixed with deciduous wetland trees such as red maple or black tupelo. Species of the genus <i>Sphagnum</i> are an important component of the moss layer. <i>North-central interior wet flatwoods</i> usually occurs on poorly drained uplands or in depressions associated with glacial features such as tillplains, lakeplains or outwash plains. Soils often have an impermeable or nearly impermeable clay layer that can create a shallow, perched water table. Saturation can vary, with ponding common during wetter seasons, and drought possible during the summer and autumn months. These fluctuating moisture levels can lead to complexes of forest upland and wetland species occurring within this system. Pin oak typically dominates and is often associated with swamp white oak and Red maple. American sweetgum and black tupelo are also common associates. Understory herbaceous and shrub species present in examples of this system can vary. Some common species include sedges, cinnamon fern, common buttonbush, alder, and holly (Gawler 2008).</p>	<p>Migratory species</p>

Priority Refuge Resources of Concern ¹	Habitat Structure ²	Associated Species ³
Forested Uplands and Wetlands⁴		
Shrub Swamp and Floodplain Forest⁵ - 114 acres		
American Black Duck ^{A, B, C, G}	Migrating habitat includes herbaceous wetlands, fens, and flooded meadows and shrub-swamps (Longcore et al. 2000, DeGraaf et al. 2001).	Northern Harrier ^{I, J} Wood Duck ^{A, I, J} Green-winged Teal ^{A, I, J} Snowy Egret ^{A, I, J} Rusty Blackbird ^A American Bittern ^{A, I} Common Merganser ^I Bufflehead ^A Canada Goose, NAP ^{A, J} Canada Goose, AP ^{A, J} Virginia Rail ^I Marsh Wren ^{A, I} Mallard ^{A, I, J} Davis' Sedge ^I Waputo ^I Gray Catbird ^{A, I, J} Willow Flycatcher ^{A, I} Warbling Vireo ^I Spotted Turtle ^I Eastern Kingbird ^{A, I, J}
Non-Forested Uplands and Wetlands⁴		
Freshwater Marshes⁵ - 280 acres		
American Black Duck ^{A, B, C, G}	Migrating habitat includes herbaceous wetlands, fens, and flooded meadows and shrub-swamps (Longcore et al. 2000, DeGraaf et al. 2001).	Northern Harrier ^{I, J} Wood Duck ^{A, I, J} Green-winged Teal ^{A, I, J} Snowy Egret ^{A, I, J} Rusty Blackbird ^A American Bittern ^{A, I} Common Merganser ^I Bufflehead ^A Canada Goose, NAP ^{A, J} Canada Goose, AP ^{A, J} Virginia Rail ^I Marsh Wren ^{A, I} Mallard ^{A, I, J} Davis' Sedge ^I Waputo ^I Gray Catbird ^{A, I, J} Willow Flycatcher ^{A, I} Warbling Vireo ^I Spotted Turtle ^I Eastern Kingbird ^{A, I, J}

Priority Refuge Resources of Concern ¹	Habitat Structure ²	Associated Species ³
Non-Forested Uplands and Wetlands⁴		
Pasture/Hay/Grassland⁵ – 1,393 acres		
Where appropriate and supported by the local community, restore to floodplain forest	<i>Laurentian-Acadian floodplain forest</i> occur along medium to large rivers, and include a matrix of upland and wetland habitats. Floodplain forests, with silver maple are characteristic, as well as herbaceous sloughs and shrub wetlands. Most areas are underwater each spring; micro-topography determines how long the various habitats are inundated. Associated trees include red maple and American hornbeam, the latter frequent but never abundant. On terraces or in more calcium rich areas, sugar maple or red oak may be locally prominent, with yellow birch and ash, black willow is characteristic of the levees adjacent to the channel. Common shrubs include silky dogwood and viburnum. The herb layer in the forested portions often features abundant spring ephemerals, giving way to a fern-dominated understory in many areas by mid-summer. Non-forested wetlands associated with these systems include shrub-dominated and grass-non-woody vegetation (Gawler 2008).	Migratory Species
Inland Aquatic Habitats⁴		
Water⁵ – 210 acres		
American Eel^{E, F}	Migrating and feeding habitat includes lakes, streams and large rivers (USFWS 1996)	Smallmouth Bass ^I Burbot ^I Striped Bass ^I Pumpkinseed ^I Longnose Dace ^I Yellow Perch ^I
Shortnose Sturgeon^{B, D, E, G}	Spawn in slow-moving, 48 F water of large rivers, and feed in fresh and brackish water along the river bottom (USFWS 1996).	
Alewife^{B, F, G}	Spawn in ponds and slow-moving streams (USFWS 1996).	
Atlantic Salmon^{B, F, G}	Spawn in cold freshwater moving streams w/ coarse clean gravel and adequate food/cover. Migrate in large rivers (VTWAP 2005).	
Blueback Herring ^{F, G}	Spawn in fast moving, shallow water when the river temperature is about 58 F (USFWS 1996).	
American Shad^{B, F, G}	Spawn when the water temperature is above 60° F in shoal area of river and lower reaches of larger tributaries (USFWS 1996).	
American Black Duck ^{A, B, C, G}	Migrating habitat includes open water, such as, estuaries, coves or bays with submerged aquatic vegetation, mollusks and crustaceans for foraging (DeGraaf et al. 2001).	Canada Goose, Atlantic ^A Canada Goose, North Atlantic ^A Bufflehead^A Mallard ^A Snowy Egret ^{A, I, J} Bald Eagle ^{A, I} Wood Duck ^A Green-winged Teal ^A

1 - These species of conservation concern and associated habitats, as well as under-represented and sensitive ecological systems constitute the management focus for the CFA, and recommended for the CPA. They were identified based on specific criteria, and are included in the following plans, databases and/or have Federal status.

A: 2008 Bird Conservation Region 30.

B: 2009 North Atlantic Landscape Conservation Cooperative Development and Operations Plan.

C: 2008 USFWS Birds of Conservation Concern.

D: Federal Threatened and Endangered status as of 2010, including Candidate Species

E: Federal Elevated Concern species or species petitioned for threatened and endangered listing as of 2010

F: 2009-2013 USFWS Northeast Region Fisheries Program Strategic Plan

G: Silvio O Conte Refuge Purpose Species.

H: 2008 Northeastern Terrestrial Habitat Classification System.

2 - This habitat structure will benefit the listed priority refuge resources of concern, and is based on the most recent literature.

3 - These species are a compilation from the following plans, and are associated with the habitat type and/or will benefit from all or a portion of the habitat structure associated with the priority species. This is not a comprehensive list of species.

A: 2008 Bird Conservation Region 30.

I: 2005 Connecticut Comprehensive Wildlife Conservation Strategy

J: 2012 Terrestrial and Wetland Representative Species of the North Atlantic: Species Selected, Considered, and Associated Habitats (Ecological Systems). These species were LCC candidate species and are represented by the selected LCC Representative Species.

4 - CCP Objectives from Silvio O. Conte NFWR Comprehensive Conservation Plan, Chapter 4, Service - preferred Alternative.

5 - These habitat types are based on the North Atlantic Landscape Conservation Cooperative (NALCC) habitat groupings for associated Representative Species, which were derived from The Northeastern Terrestrial Habitat Classification System (NETHCS). See table A.52 for a comparison of the NALCC habitat groupings and NETHCS.

BOLD - These species are LCC Representative Species, which is a species that, because of its habitat use, ecosystem function, or management response, typifies lifecycle or habitat requirements for a larger group of species.

* The Refuge Improvement Act directs the US Fish and Wildlife Service to maintain Biological Integrity, Diversity, and Environmental Health (BIDEH).

Elements of BIDEH are represented by native fish, wildlife, plants and their habitats as well as those ecological processes that support them.

Goals, Objectives, and Strategies for Refuge Lands in the Scantic CFA under Alternative C

Goal 1: Wildlife and Habitat Conservation: Promote the biological diversity, integrity, and resiliency of terrestrial and aquatic ecosystems within the Connecticut River watershed in an amount and distribution that sustains ecological function and supports healthy populations of native fish, wildlife, and plants, especially Federal trust species of conservation concern, in anticipation of the effects of climate, land use, and demographic changes.

Objective 1.1: Forested Uplands and Wetlands

Sub-objective 1.1a. (Hardwood Forest)

Improve the diversity of seral stages and (where and when possible) restore historic composition and structure, and improve landscape connectivity of hardwood forest habitat to support species of conservation concern and aid in climate change adaptation. Management will provide stopover habitat for spring and fall migrants.

Rationale:

We envision healthy forests within the Scantic CFA where a diverse seral structure provides suitable habitat conditions for a suite of Connecticut wildlife. Our long-term vision for the CFA includes hardwood forests characterized by complex horizontal and vertical structure, a generally closed canopy, large-diameter trees, dead woody material, snags and cavity trees, native species diversity, softwood inclusions, and a diversity of wildlife (Foster et al. 1996, Goodburn and Lorimer 1998, Keeton 2006, D'Amato et al. 2009, Curzon and Keeton 2010).

Scantic CFA hardwood forests are diverse and productive for wildlife, and abundant, high-quality habitat is certainly available within the CFA. To date our review of the Scantic CFA habitats and wildlife species—and their condition—has been limited to coarse-scale information: the careful analysis of spatially-explicit habitat data using GIS, the consultation of local, state, and regional species conservation plans, and an understanding of forest disturbance and land-use history in New England. This allowed identification of broad habitat types, and species of conservation concern known to utilize characteristics common to these habitats. Our understanding of the forest structure within Scantic comes exclusively from a reading of forest history in New England—a legacy of intensive past-use that altered the vegetation structure and composition, landscape patterns, and ongoing ecological dynamics (Cronon 1983, Whitney 1996, Foster et al. 1997, 2002, Bellemare et al. 2002). Our sub-objective assumes the forests of the Scantic are more homogeneous than those of three centuries earlier, and include more sprouting and shade-intolerant species and fewer long-lived mature forest tree species (Goodburn and Lorimer 1998, Foster et al. 1998, Foster 2000, Bellemare et al. 2002, Cogbill et al. 2002, Abrams 2003). Completing a comprehensive forest and habitat inventory post-acquisition will test these assumptions, and aid in identifying stands where a forest management approach that combines passive management and the application of silvicultural treatments designed to emulate gap dynamics, will promote compositional and structural diversity, and where appropriate, move succession forward to emulate later seral stage characteristics.

Migrating landbirds are typically unable to deposit sufficient fat stores to fly nonstop between breeding and nonbreeding areas (Blem 1980) and must use stopover habitats for feeding and resting before continuing migration. Studies have shown migrating birds exhibit selective use of some habitats over others (Moore et al. 1990, Petit 2000, Rodewald et al. 2004). In general, taller, more structurally diverse vegetation types within an area appear to support greater numbers of migrating birds than do habitats of lower stature and complexity (Moore et al. 1990, Noss 1991). Clearly, structurally complex habitats will not be suitable for all migratory species, but our conservation goal is to provide those areas used most frequently by migrating birds, suggesting relatively tall, structurally diverse habitats may best serve this purpose. The plasticity in habitat use exhibited by most species during migration (Moore et al. 1990, Petit 2000) suggests that many species are able to effectively use the food resources and cover afforded by structurally complex habitats. While our management goals may create a relatively old forest, hardwood forests within Scantic will contain a variety of patches in different age classes and developmental stages; it is not uniform throughout. This diversity of age classes provides a variety of bird species with a range of foraging opportunities. Patches of mature edge-dominated (i.e. forest-agricultural edge and suburban forest of the type within Scantic) and shrub-sapling stage forests were used most frequently by fall stopover migrants in a Pennsylvania study (Rodewald et al. 2004).

In a mature forest, many migrating bird species tend to remain within specific vegetation layers: on or near the ground, in the middle layer, or up in the canopy. Hardwood forests within Scantic should have all forest layers present in moderate to high amounts distributed throughout a stand and across the landscape. Enhanced vertical structure will provide the greatest number of bird species with the greatest number of foraging opportunities. Our active forest management efforts will aim to create or maintain a canopy that is generally closed (greater than 75 to 80 percent closure) with small gap openings scattered throughout a stand and the CFA. These openings will be caused by or mimic small, single- to few-tree disturbances and create opportunities for regenerating intermediate- and shade-tolerant species. Regeneration in these openings will provide a continual supply of ephemeral shrub-sapling habitat rich in fruits and insects important to migrating birds (Noss 1991, DeGraaf et al. 2006). Efforts to regenerate any portion of forest within the CFA must account for the abundance of invasive understory species and risk of regeneration failure from white-tailed deer overbrowsing (Hochholzer 2010)

Implementation of refuge strategies will begin with a comprehensive, multi-scale forest and wildlife habitat inventory. Forest wildlife species survival and breeding success is dependent not only on the habitat at the stand level, but also the surrounding landscape, making it necessary to consider the proportions and sizes of stand types and successional stages within the CFA and the associated landscape. Baseline information on the condition of hardwood forests at the time of acquisition will further inform more detailed, stand-level habitat prescriptions within a required step-down HMP.

Management Strategies:

Within 5 years of land acquisition and CCP approval:

- Identify forest stands with late successional characteristics for passive management, and those where active management is necessary to improve forest structure. Appendix J provides general forest management guidelines, including descriptions of forestry techniques and explanations about how we will determine where and how to conduct active management.
- Work with partners, including the State of Connecticut, in support of the State Wildlife Action Plan, to ensure management on Service lands complement adjacent land management objectives.

Within 10 years of land acquisition and CCP approval:

- Implement identified active forest management opportunities using accepted silvicultural practices. Appendix J provides general forest management guidelines, including descriptions of forestry techniques and explanations about how we will determine where and how to conduct active management.
- Protect hard and soft mast producing species such as American beech inclusions, and apple and cherry trees, through the use of best management practices.
- Ensure a diversity of native species is present and non-native species are excluded or managed to keep population levels as low as possible.
- Explore research opportunities with academic partners to address efficacy of forest management in meeting wildlife objectives.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Conduct forest and wildlife inventories.
- Map natural communities; protect rare or exemplary examples.
- Map vernal pools and seeps.

Sub-objective 1.1a. (Hardwood swamp)

Improve the diversity of seral stages, (where and when possible) restore historic composition and structure, and improve the natural hydrology to support natural and rare ecological communities. Management will provide stopover habitat for spring and fall migrants.

Rationale:

Occurrences of hardwood swamps within the Scantic Conservation Focus Area (CFA) represent a number of natural communities. Historically they have undergone significant alteration, and have great potential for restoration. Acidic hardwood swamps may be found in basins, or on gently sloping seepage lowlands within small patches where an acidic substrate of mineral soil, often with a component of organic muck, creates a shallow, perched water table. Eastern hemlock is often the dominant overstory species, and the organic substrate supports an important sphagnum (moss) layer.

Hardwood swamp occurrences within Scantic with more alkaline soils are often found along riparian and floodplain areas in small patches where soils have an impermeable or nearly impermeable clay layer that can create a shallow, perched water table. Saturation can vary, with ponding of water common during wetter seasons and drought during the summer or autumn months. The dynamic nature of the water table drives complexes of forest upland and wetland species including pin oak, red maple, swamp white oak, sweetgum, and blackgum. The examples identified within the Scantic CFA occur within the floodplain of the Connecticut River.

These two systems do share a common disturbance history; agricultural practices, development pressures, and selective logging have largely removed these habitats from the landscape, or greatly simplified their historic species composition. Changes in hydrology, water pollution, invasive species introductions, and soil compaction remain as threats. Successional trends in hardwood swamps are not well understood. One possibility is that these areas were once in softwoods such as hemlock, fir, cedar, or spruce. Heavy cutting and clearing for agriculture often eliminated softwood species. Our conservation efforts within the Scantic will focus on promoting the ecological integrity of these stands through restoration of degraded floodplains, and (where and when possible) restoring composition and structure to accepted historical conditions. Restoration of the primary natural disturbance mechanism (seasonal flooding) will aid in the restoration of historical species mixtures.

Restoration of forest habitats, natural levees, backwater sloughs, and oxbow lakes will create high-quality habitat for spring and fall migrant birds in an otherwise agricultural landscape where small, disturbed forest fragments are the rule. Closed canopy deciduous forests that include pin oak and other hardwoods provide mast and other foraging sites shown to be important during the energy-intensive migration (Petit 2000).

Implementation of refuge strategies will begin with a comprehensive, multi-scale forest and wildlife habitat inventory. Forest wildlife species survival and breeding success is dependent not only on the habitat at the stand level, but also the surrounding landscape, making it necessary to consider the proportions and sizes of stand types and successional stages within the CFA and the associated landscape. Baseline information on the condition of hardwood swamps at the time of acquisition will further inform more detailed, stand-level habitat prescriptions within a required step-down HMP.

Management Strategies:

Within 5 years of land acquisition and CCP approval:

- Work with partners, including the State of Connecticut in support of the State Wildlife Action Plan, to ensure management on Service lands complement adjacent land management.
- Evaluate hydrologic regime to inform restoration efforts.
- Identify forest stands where management is necessary to improve species composition. Appendix J provides general forest management guidelines, including descriptions of forestry techniques and explanations about how we will determine where and how to conduct active management.

Within 10 years of land acquisition and CCP approval:

- Implement identified forest management opportunities to improve species composition. Appendix J provides general forest management guidelines, including descriptions of forestry techniques and explanations about how we will determine where and how to conduct active management.
- Explore research opportunities with academic partners to address efficacy of forest management in meeting wildlife objectives.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Conduct forest and wildlife inventories.
- Map natural communities; protect rare or exemplary examples.
- Map vernal pools and seeps.

Sub-objective 1.1c. (Shrub Swamps and Floodplain Forest)

Manage shrub swamp and floodplain forest communities to support natural and rare ecological communities, and provide breeding, foraging and stopover habitat for priority refuge resources of concern including American black duck.

Rationale:

Shrub swamps are restricted to poorly drained areas, small seepage zones, and wide alluvial stretches of rivers and small streams. Shrubs tend to dominate the wetland, though grasses may be present. Typical species include willow, silky dogwood, speckled alder, white meadowsweet, bluejoint, tall sedge, and common rush. Our coarse-scale habitat analysis of this CFA identifies an 8-mile wetland complex in South Windsor on the east side of the Connecticut River. This complex is floodplain habitat consisting of a mosaic of freshwater marsh, shrub swamp, and hardwood swamp. This area is also interspersed with agricultural land, and adjacent to East Hartford. Please see sub-objective 1.2a for a detailed discussion on this wetland complex, freshwater marsh communities, and priority resources of concern.

Management Strategies:

Within 5 years of land acquisition and CCP approval:

- Minimize refuge activities that disturb wetland communities.
- Work with partners, including the State in support of the State Wildlife Action Plan, to ensure management on Service lands complement adjacent land management objectives.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Survey wildlife utilization of wetlands.
- Map natural communities; protect rare or exemplary examples.

Objective 1.2: Non-forested Uplands and Wetlands

Sub-objective 1.2a. (Freshwater Marsh)

Manage freshwater marsh communities to support natural and rare ecological communities, and provide breeding, wintering and stopover habitat for priority refuge resources of concern including American black duck.

Rationale:

Freshwater marshes are often dominated by emergent and submergent herbaceous vegetation. Scattered shrubs are often present, and trees are generally absent. Herbaceous vegetation typically includes common bulrush, jewelweed, marsh fern, water lily and narrow-leaved cattail (Gawler 2008). The freshwater marsh habitat within the Scantic CFA is part of a larger wetland complex on the east side of the Connecticut River. This complex is floodplain habitat consisting of freshwater marsh, shrub swamp, and hardwood swamp. It is also interspersed with agricultural land and adjacent to East Hartford. This area is under intense development pressure, threatening state listed and refuge priority resources of concern.

This floodplain habitat in the Scantic CFA is a state priority for conservation. It provides habitat for a suite of species of conservation concern. American black duck, a refuge priority resource of concern and NALCC representative species for freshwater marsh, winters in the Scantic CFA. Black ducks forage on aquatic vegetation in wetlands during the winter and on invertebrates and vegetation during migration. The Connecticut River is an important migration corridor, and the Scantic CFA also supports migratory Canada geese, bufflehead,

canvasback, American wigeon, mallard, wood duck, northern pintail, gadwall, and mergansers. The freshwater marshes also support several rails and bitterns during the breeding season and migration.

Threats to this wetland complex are altered hydrology, contamination, and non-native invasive plant species. A multi-scale wildlife habitat inventory will be necessary to determine the condition of all habitats in the CFA. This baseline information will further inform more detailed habitat prescriptions within a required step-down HMP.

Management Strategies:

Within 5 years of land acquisition and CCP approval:

- Minimize refuge activities that disturb wetland communities.
- Encourage local landowners to use Connecticut Best Management Practices within active agricultural fields that are located along the perimeter of marsh habitats.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Map natural communities; protect rare or exemplary examples.
- Survey wildlife use of wetlands.
- Inventory wetland plant communities, and evaluate wetland hydrology for potential impacts to the natural flow regimes.

Sub-objective 1.2b. (Pasture/Hay/Grassland)

Restore historic composition and structure, and improve the natural hydrology and landscape connectivity to support natural and rare ecological communities. Management will provide stopover habitat for migratory species.

Rationale:

Thirty percent of the Scantic CFA is typed as pasture, hay, and grassland habitat. The majority of these habitats is in active agricultural use, and is located in floodplain of the Connecticut River. This large floodplain extends approximately 8 miles along the Connecticut River, and is a natural flood storage area for the surrounding communities.

The topography and natural processes of floodplain systems result in the development of complex upland and wetland vegetation on generally flat topography, and soils deposited by the river. The Scantic CFA has this diversity of habitats in areas not cleared for agricultural use. Hardwood forests and swamps, shrub swamps, and freshwater marsh are part of the floodplain. Silver maple is a characteristic species of a floodplain forest, as well as red maple, ash, red oak, and yellow birch. Common shrubs include black willow, silky dogwood, and viburnums. The herbaceous layer within the forested portions of the floodplain, include spring ephemerals and ferns (Gawler 2008).

Restoration of this floodplain will provide a more contiguous and diverse breeding and migratory habitat for a variety of wildlife species. The Scantic CFA is significant migration habitat as it straddles the Connecticut River, an important migratory corridor. A restored floodplain will also improve its function to retain and slow flood waters, reducing the extent of damage to the surrounding communities, and thereby improving water quality.

However, we also support the protection of high-value, productive agricultural lands identified by local communities and the State. It is not the refuge's intention to target these lands for acquisition. Instead, our priority would be to work with individual landowners, states, and other Federal agencies to protect these lands and ensure they continue to be part of the working landscape. There are many State and Federal programs that protect agricultural lands and help promote farming practices that benefit wildlife and help protect water quality. Through our private lands program, we will help direct landowners who are interested in these programs to the proper state and Federal agencies and programs. In rare cases, we may acquire agricultural lands from willing sellers, when other options to keep the land in agricultural production are not available, or if habitats for Federal trust resources are in jeopardy from development or other land use changes.

Management Strategies:

Within 5 years of land acquisition and CCP approval:

- Work with partners and landowners to promote farming practices that benefit wildlife and protect water quality.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- As new pasture, hay, and/or grassland habitat is acquired, evaluate its ecological importance to determine if it should be maintained or if it should be restored to native forest through tree plantings or natural succession.

Objective 1.3: Inland Aquatic Habitats

Sub-objective 1.3a. (Open Water)

In collaboration with partners, identify and implement habitat restoration opportunities within the Scantic CFA and Connecticut River to benefit priority refuge resources of concern including American shad, shortnose sturgeon, American eel, alewife, blueback herring, and Atlantic salmon, as well as other species of conservation concern such as sea lamprey.

Rationale:

The Scantic CFA straddles the Connecticut River, and is located at the mouth of the Podunk, Scantic, and Farmington Rivers. Many species of conservation concern use these aquatic habitats including American shad, shortnose sturgeon, American eel, alewife, blueback herring, Atlantic salmon, and sea lamprey.

This section of the Connecticut River, and mentioned tributaries are important spawning habitat for shad, alewife, and blueback herring. The main stem also provides crucial spawning habitat for the federally listed shortnose sturgeon. This species is not known to spawn in any other sections or tributaries of the river in Connecticut.

American eel also occupy the main stem and tributaries within the Scantic CFA. American eel are long lived, and spend the majority of their young life in these freshwater systems. American eel enter the Connecticut River as juveniles, and migrate upstream to inhabit bays, estuaries, streams, lakes, and ponds. Eels feed in these aquatic habitats until they reach sexual maturity and begin the long migration to their spawning grounds in the Sargasso Sea (ASMFC 2000).

Another species of conservation concern that utilize freshwater aquatic habitats in this CFA is sea lamprey. Sea lamprey enter the Connecticut River and tributaries to reproduce, and in the process provide important ecological benefits to aquatic systems. Adults transport nutrients between freshwater and saltwater systems, their nest construction restores and enhances streambed structure, abandoned nests are used by other riverine fish, and lamprey eggs and larvae provide food for a variety of species (Kircheis 2004). As with many riverine fish, sea lamprey movement is impeded by barriers on the main stem and tributaries.

The aquatic habitats in the Scantic CFA provide habitat for many species of conservation concern, and is especially important for the federally listed shortnose sturgeon. We will work with partners to analyze current available data, and conduct additional assessments, as needed, to inform more detailed management and monitoring strategies within a required step-down HMP.

Management Strategies:

Within 5 years of land acquisition and CCP approval:

- Work with partners to maintain open channels from the Connecticut River to open water coves.
- Work with adjacent landowners to eliminate barriers to aquatic species passage.

Within 10 years of land acquisition and CCP approval:

- Work with partners to protect and increase “hard bottom” (e.g., gravel, cobble, or bedrock) for spawning aquatic species.
- Work with partners to reduce combined sewer overflow.

Objective 1.4: Coastal Non-forested Uplands (coastal beaches and rocky shores)

Not applicable

Objective 1.5: Coastal Wetlands and Aquatic Habitats (tidal salt marsh and estuary)

Not applicable

Goal 2: Education, Interpretation, and Outreach: Inspire residents and visitors to actively participate in the conservation and stewardship of the exceptional natural and cultural resources in the Connecticut River watershed, and promote a greater understanding and appreciation of the role of the Silvio O. Conte National Fish and Wildlife Refuge in conserving those resources.

Objective 2.1: Environmental Education

In collaboration with public and private educators from all four states in the watershed, lead or facilitate the implementation of structured natural and cultural resource curricula, with a focus on guiding educators and students to develop an awareness of, and concern about, natural and cultural resources and associated challenges; appreciate our conservation history; make informed decisions and work individually or collectively toward solutions; and model responsible environmental stewardship in their everyday lives.

Sub-objective 2.1a. (Environmental Education Planning and Training)

Encourage schools, scout groups, and summer camps to develop curricula that use the Scantic Division as an outdoor classroom.

Rationale:

See environmental education rationale in chapter 4 detailing the importance of environmental education for the Service. Environmental education is one of the six priority, wildlife-dependent recreational uses of the Refuge System. Environmental education is particularly important at Conte Refuge because one of its founding purposes is to provide opportunities for environmental education. Environmental education is an important tool that can help refuge visitors and local residents, particularly students, appreciate the importance of this area to the larger watershed.

Management Strategies:

Within 1 year of acquiring sufficient land:

- Encourage schools, scout groups, and summer camps to develop curricula that use the Scantic Division as an outdoor classroom.

Sub-objective 2.1b. (Environmental Education Delivery)

Encourage schools, scout groups, and summer camps to use the Scantic Division as an outdoor classroom.

Rationale:

Because this division will be unstaffed, the majority of environmental education opportunities on this division will be led by partners, volunteers, and local school groups and other educational groups (e.g., scout groups and summer camps).

Management Strategies:

Within 1 year of acquiring sufficient land:

- Encourage schools, scout groups, and summer camps to develop curricula that use the Scantic Division as an outdoor classroom.

Objective 2.2: Interpretation

Develop, lead, and facilitate interpretive programs that emotionally and intellectually connect the audience to natural and cultural resources in the watershed.

Sub-objective 2.2a. (Natural and Cultural Resource Interpretive Planning and Training)

With Friends groups, public and non-profit organizations, and volunteers, offer quality interpretive programming at the Scantic Division. The development of highly trained interpreters will be encouraged by offering interpretive training to Friends' members, partners, and volunteers on a regular basis.

Rationale:

See the rationale in chapter 4 detailing the importance of interpretation for the Service. Interpretation is an important tool that can help refuge visitors and local residents appreciate the importance of this area to the larger watershed. With an ADA-compliant trail planned for the site, the Scantic Division will be well suited to support both self-guided, wildlife dependent interpretive experiences, as well as guided interpretive programs that convey messages about the refuge and about the Scantic Division's habitats and cultural resources.

Management Strategies:

(These strategies are dependent on land acquisition from willing landowners.)

Within 5 years of acquiring sufficient land:

- Inventory and evaluate each CFA to determine the appropriate interpretive materials to employ.
- Create meaningful, consistent, thematic statements to be used in the delivery of programming at the Scantic Division.
- Provide resources and trainings to Friends, and volunteers in support of interpretive programs.

Within 10 years of acquiring sufficient land:

- Develop standardized self-guided interpretive services, such as interpretive trails and kiosks, exhibits, and printed media.
- Employ a variety of themed interpretive offerings (e.g., presentations, audio-visual programs, brochures, and exhibits) when creating programming for natural and cultural resource interpretation.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Build an evaluation process that includes formal and informal evaluation to assess the effectiveness of all interpretation programs.

Sub-objective 2.2b. (Natural and Cultural Resource Interpretive Program Delivery)

Collaborate with Friends group, partners, and volunteers to deliver quality natural and cultural resource interpretive programs.

Rationale:

See rationale for sub-objective 2.2a.

Management Strategies:

(These strategies are dependent on land acquisition from willing landowners.)

Within 5 years of acquiring sufficient land:

- Through partners, and Friends group, annually provide quality interpretive programs, exhibits, printed media at the Scantic Division.
- Incorporate thematic statements, measureable objectives, and evaluation measures into all interpretation efforts.
- Publicize interpretive programs through traditional media, on the refuge web site, and digital social media conduits.

- Maintain a supply of print interpretive brochures, i.e., general brochure and bird checklist that incorporate refuge interpretive messages and themes.
- Work with partners to create issue-oriented experiential activities and programs for use at their facilities.

Within 10 years of acquiring sufficient land:

- Contribute refuge interpretive information for scenic byways and other state publications and signs.
- Develop self-guided interpretive messages and use state of the art as well as traditional media (e.g., brochures).

Objective 2.3: Public and Community Outreach

Support, promote, and coordinate a wide range of outreach tools and activities to facilitate and improve communications and relationships with the American public, especially communities, adjacent landowners, and elected officials in the Connecticut River watershed, and to empower citizens to recognize and resolve local natural resource issues and promote conservation and the responsible use of natural resources.

Because the Scantic Division would be unstaffed and does not have refuge facilities, public and community outreach for this site will occur through regular outreach activities at the headquarters and will not specifically occur at this site.

Objective 2.4: Science and Technical Outreach

Facilitate the collection and exchange of information that increases the knowledge and understanding of natural and cultural resources, addresses climate change and other conservation issues, and provides land managers with better information to make management decisions affecting resources.

Because the Scantic Division would be unstaffed and does not have refuge facilities, science and technical outreach for this site will occur through regular outreach activities at the headquarters and will not specifically occur at this site.

Goal 3: Recreation: Promote high-quality, public recreational opportunities in the Connecticut River watershed that are complementary between ownerships and provide regional linkages with emphasis on promoting wildlife-dependent activities that connect people with nature.

Objective 3.1: Hunting

Support quality public hunting opportunities in the Connecticut River watershed to promote a unique understanding and appreciation of natural resources and their management on lands and waters, while also protecting a traditional outdoor pastime deeply rooted in America's natural heritage and conservation history.

Sub-objective 3.1a. (Hunting Opportunity, Access, and Infrastructure)

Provide the opportunity for a quality hunting experience based on state regulations.

Rationale:

The Scantic CFA is comprised of floodplain forests and wetlands adjacent to the Connecticut River. Existing public hunting in the area is limited to the Connecticut River proper for waterfowl and Kings Island Coop Wildlife Management Area which offers waterfowl hunting under a state permit. Much of the Scantic CFA is adjacent to municipal Hartford which limits hunting opportunities. We will coordinate with Connecticut Department of Energy and Environmental Protection, Hunting Review Team following acquisition of land where hunting is feasible and has been found to be a compatible use. Retaining hunting opportunities on public lands will ensure this wildlife-dependent recreational activity continues and contributes to the state's population management objectives.

Management Strategies:

(These strategies are dependent on land acquisition from willing landowners.)

Within 1 year of acquiring sufficient land to support hunting seasons:

- Complete all administrative requirements to officially open to hunting consistent with State hunting regulations and, if necessary, additional refuge-specific regulations.
- Consult with Connecticut Department of Energy and Environmental Protection, Hunting Review Team in evaluating the suitability of new acquisitions to support a safe, manageable hunt program, consistent with the final compatibility determination.
- Allow hunters access to the refuge outside of the normal division open hours (i.e. 30 minutes before sunrise and 30 minutes after sunset) as long as they are engaged in lawful hunting activities.
- Post newly acquired properties to ensure refuge boundary lines are clearly marked.
- Install an informational kiosk in a conspicuous location to post information on hunting seasons and other notices to visitors.
- Allow temporary tree stands and blinds that meet state hunting regulations and do not harm trees or other refuge vegetation. Tree stands and blinds must have the owner's name and phone number clearly displayed, and they must be removed at the end of the hunt season.

Within 5 years of acquiring land sufficient land to support hunting seasons:

- Work with Connecticut Department of Energy and Environmental Protection to determine whether opportunities exist for state-recognized disabled hunters.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Work with Connecticut Department of Energy and Environmental Protection to evaluate the effectiveness and success of a refuge hunt program in contributing to state population objectives.

Sub-objective 3.1b. (Hunter Education and Outreach)

Provide hunter education classes access to the division and conduct directed outreach to ensure hunters are informed about regulations, hunter ethics, and safety considerations. Develop programs, including brochures, signage, website pages, media releases, etc. to increase interest in hunting at the division.

Rationale:

Hunting is a priority public use that also serves as a population management tool. Providing hunter education instructors the opportunity to use the division with their classes will strengthen connections to the hunting community and student understanding of the role hunting plays in wildlife management. Making relevant information readily available to hunters through a variety of media will improve the quality of the hunting experience.

Management Strategies:

(These strategies are dependent on land acquisition from willing landowners.)

Within 1 year of acquiring sufficient land to support hunting seasons:

- Produce a hunt brochure that includes a hunt map and information on regulations, hunter ethics, safety considerations, etc. and make it available on the refuge website, at Scantic Division kiosks, through a friends group, and in local businesses.
- Provide visitors with general information on the hunting program and refuge-specific and State regulations through the refuge website, information signs, and a hunting brochure. In all materials related to the hunting program, promote and encourage the use of lead-free ammunition.
- Work with the State to identify and evaluate the impacts associated with requiring the use of non-toxic ammunition for hunting on refuge lands.

Within 5 years of acquiring land sufficient land to support hunting seasons:

- Work with Connecticut Department of Energy and Environmental Protection to encourage youth hunting at the division as a means of introducing young people to this traditional recreation activity.
- Offer to host hunter education field courses.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Develop a system to monitor and evaluate the hunting program with hunters and other users to determine if the objective is being met and to allow for adaptive management.

Objective 3.2: Fishing

Support quality, public fishing opportunities in the Connecticut River watershed to promote an understanding and appreciation of natural resources and their management on lands and waters, while also protecting a traditional outdoor pastime deeply rooted in the America's natural heritage and conservation history.

Sub-objective 3.2a. (Fishing Opportunities, Access, and Infrastructure)

Provide quality fishing opportunities at the Scantic Division after completing all administrative procedures to officially open refuge lands to fishing, based on Connecticut Department of Energy and Environmental Protection regulations and division-specific regulations, if necessary.

Rationale:

The principal fishing resources on this CFA are the Connecticut River and the lower reaches of the Scantic and Farmington rivers. The Podunk River, Newberry and Stoughton brooks are also within the CFA. Most people fish the Connecticut River from boats, but allowing bank fishing on a Scantic Division would provide the public with another recreational opportunity. Fishing is a popular activity in this area and would continue under Service ownership. Retaining fishing opportunities conforms to historic use on CFA and much of the surrounding land in the area.

Management Strategies:

(These strategies are dependent on land acquisition from willing landowners.)

Within 1 year of acquiring land with fishable waters:

- Complete all administrative requirements to officially open to fishing consistent with State hunting regulations and, if necessary, additional refuge-specific regulations.
- Post newly acquired properties to ensure refuge boundary lines are clearly marked.
- Install an informational kiosk in a conspicuous location to post information on fishing seasons and other notices to visitors.
- The Scantic River Division would be open to visitors actively engaged in fishing during the seasons and times established by the state in their annual fishing regulations.

Within 5 years of acquiring land with fishable waters:

- Work with the Connecticut Department of Energy and Environmental Protection to inventory and assess fish populations on the division.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Develop a system to monitor and evaluate the fishing program with anglers and other users to determine the objective is being met and to allow for adaptive management.

Sub-objective 3.2b. (Angler Education and Outreach)

Develop programs, including brochures, signage, website pages, media releases, etc. to inform visitors of fishing opportunities at the division.

Rationale:

Fishing is a priority public use and a traditional use in the CFA. If land is acquired, the refuge will make information readily available to interested anglers regarding opportunities to fish on Service-owned land, location of fishable waters, and the available game fish.

Management Strategies:

(These strategies are dependent on land acquisition from willing landowners.)

Within 1 year of acquiring land with fishable waters:

- Produce a fishing brochure that includes information on regulations, angler ethics, safety considerations, etc. and make it available on the refuge website, at informational kiosks, and in local businesses. In all materials related to the fishing program, promote use of lead-free tackle.

Objective 3.3: Wildlife Observation and Photography

Support quality, public opportunities to observe and photograph wildlife in the Connecticut River watershed in a variety of natural habitats to connect a broad spectrum of people with nature.

Sub-objective 3.3a. (Infrastructure and Access for Wildlife Observation and Photography)

Provide quality opportunities for wildlife observation and photography for people of all physical abilities.

Rationale:

Wildlife viewing and photography is a priority public use on national wildlife refuges and a popular recreational activity. Opening acquired land in this new division to wildlife observation and photography will provide visitors a chance to see and photograph a variety of wildlife species in their native habitats, while learning more about the Service, Refuge System, and the refuge.

Management Strategies:

(These strategies are dependent on land acquisition from willing landowners.)

Within 1 year of acquiring land:

- Allow public access from 30 minutes before sunrise to 30 minutes after sunset with the exception listed for hunters and anglers.
- Install an informational kiosk in a conspicuous location to post information on wildlife observation and photography opportunities, and other notices to visitors.

Within 5 years of acquiring land:

- Develop a public access strategy and required planning (i.e. NEPA, compatibility determination) that includes consideration of developed trails, parking, kiosks, viewing platforms, blinds, interpretation, signage, etc.

Within 15 years of acquiring land:

- Implement the visitor use enhancements identified in the public access strategy and the refuge Visitor Services Plan.

Sub-objective 3.3b. (Wildlife Observation and Photography Aids)

Offer viewing and photography aids that enhance the visitor experience. Use a variety of methods to reach a broad spectrum of people. Work closely with a friends group and other partners that host events designed to view wildlife on the division.

Rationale:

The entire division would be available for wildlife observation and photography; however, there are steps the refuge can take to enhance the experience. By providing new visitors a quality experience they are more likely to return and share their experiences with others. One way to accomplish this is to offer sufficient information to attract a variety of visitors through a variety of media.

Management Strategies:

(These strategies are dependent on land acquisition from willing landowners and determination that wildlife observation and photography are compatible uses.)

Within 1 year of acquiring land:

- Allow photography blinds that do not negatively impact wildlife behavior or conflict with other visitors. Blinds must be removed each day, unless arrangements have been made via a special use permit.

Within 5 years of acquiring land:

- Develop interpretive panels describing typical wildlife on the refuge, bird migration patterns, and other messages we want to convey to visitors.
- Sponsor wildlife observation events such as International Migratory Bird Day, the Big Sit, etc.
- Encourage local schools and environmental organizations to offer wildlife-centered trips to the refuge.
- Produce a list of wildlife species and associated habitats and other conservation information on the division for distribution at informational kiosks, the refuge website, and other popular media.

Within 10 years of acquiring land:

- Develop a public access strategy and required NEPA documentation that includes consideration of developed trails, parking, kiosks, viewing platforms, blinds, interpretation, signage, etc.

Within 15 years of acquiring land:

- Implement the visitor use enhancements identified in the public access strategy and the refuge visitor services plan.

Sub-objective 3.3c. (Watershed-based Partner Initiatives)

Not applicable

Objective 3.4: Other Recreational Activities

In order to reach a broader demographic, support non-priority outdoor recreational opportunities and public access to quality, nature-based experiences throughout the Connecticut River watershed that facilitate and improve community relationships, raise awareness and an appreciation for conserving natural resources, and garner support for the National Wildlife Refuge System.

Sub-objective 3.4a. (Regional Water-based Trail Initiatives and Opportunities Including Refuge Lands)

Develop compatible opportunities on the Scantic Division that support regional water-based trail initiatives to connect people with nature, raise the visibility of the Service and the Refuge System, make the refuge more relevant to the local community, and to promote economic activity in the local area.

Rationale:

Regional water-based trails give individuals opportunities to engage in outdoor recreational opportunities in the Connecticut River watershed, such as fishing, boating, and wildlife observation. Examples include the Connecticut River waterway route.

Management Strategies:

Within 5 years of acquiring land:

- Work with public and private partners to determine whether and what roles this division might contribute to a Connecticut River waterway route.
- As lands are acquired, evaluate any water trails (e.g., canoe/kayak trails) that part of a regional or State network for their compatibility.

Sub-objective 3.4b. (Regional Land-based Trail Initiatives and Opportunities Including Refuge Lands)

Develop compatible opportunities on the Scantic Division that support regional land-based trail initiatives to connect people with nature, raise the visibility of the Service and the Refuge System, make the refuge more relevant to the local community, and to promote economic activity in the local area.

Rationale:

Regional land-based trails give individuals opportunities to engage in outdoor recreational opportunities in the Connecticut River watershed, such as hiking, wildlife observation, and interpretation. Where appropriate, we will work with these partners to promote, and distribute information about, these opportunities.

Management Strategies:

Within 5 years of acquiring land:

- As lands are acquired, evaluate any existing trails (e.g., hiking trails, snowmobile trails, horseback riding trails) that part of an established regional or State network to determine if they are appropriate and compatible uses for the refuge.

Sub-objective 3.4c. (Other Appropriate and Compatible Recreational Opportunities That Enhance Visitor Use and Enjoyment of Refuge Lands)

Allow compatible outdoor recreational opportunities on the Scantic Division that connect people with nature, raise the visibility of the Service and the Refuge System, make the refuge more relevant to the local community, and promote economic activity in the local area.

Rationale:

In addition to the priority public uses, there are other wildlife-dependent, appropriate and compatible recreational activities that can broaden the visitor base, giving people alternative ways to enjoy the natural resources at the division without detrimentally impacting the wildlife resource.

Management Strategies:

(These strategies are dependent on land acquisition from willing landowners.)

Within 1 year of acquiring land:

- Allow dispersed hiking, snowshoeing, and cross country skiing.
- Allow pet walking. In order to minimize conflicts with wildlife and other visitors, pets must be on leashes not longer than 10 feet in length.
- Allow recreational gathering of blueberries, blackberries, strawberries, raspberries, mushrooms, fiddleheads, and antler sheds.
- When compatible, allow commercial guiding in support of priority public uses by special use permit.
- Allow canoeing and kayaking in acquired coves and waterways.

Within 5 years of CCP approval:

- Work with Friends groups and partners to design and market a virtual geocache course at the division. The course should integrate orienteering with refuge interpretive messages that include linking this division to other refuge divisions and units.

Overview

Whalebone Cove Conservation Focus Area (Existing Refuge Division)

East Haddam and Lyme, Connecticut

Conservation Focus Area (CFA)—Acreage Profile	Acres	Percentage of CFA
Total CFA Acres to be Conserved by Service	3,786	54.3 %
■ Existing Refuge Ownership in CFA ¹	97	
■ Additional Acres in CFA proposed for Refuge Acquisition ²	3,689	
Existing Acres in CFA Permanently Conserved by Others ^{2,3}	3,192	45.7 %
Total Acres in CFA ^{2,4}	6,978	100 %

¹Acres from Service's Realty program (surveyed acres); ²Acres calculated using GIS; ³The Service does not plan to acquire existing conserved lands, except under extenuating circumstances (conserved acres from TNC 2010 data); ⁴The Service would conserve up to this number of acres. The Service only acquires lands from willing sellers.

What specific criteria and/or considerations drove the selection of this CFA?

The proposed Whalebone Cove CFA encompasses five SFAs from the 1995 Conte FEIS. It is part of larger area considered a priority for conservation by the State of Connecticut. The proposed CFA is located in an area with an extensive conserved lands network, including Selden Neck State Park, Becket Hill State Park Reserve, Mount Archer, and other privately conserved lands. Additional land protection by the Service in this area will help better connect these conserved lands. Also, this CFA is expected to be fairly resilient to project climate change impacts. Land conservation in the Whalebone Cove CFA and lower portion of the Quonauke CFA will help facilitate the landward migration of the coastal wetland complex.

What are the priority habitat types within the proposed CFA? What percentage of the total CFA acreage do they represent?

- Hardwood Forest – 80.5%
- Freshwater Marsh – 6.5%
- Shrub Swamp and Floodplain Forest – 2%

For more information on the habitats in the CFA, see map A.16 and table A.14.

What are the resources of conservation concern for the proposed CFA?

As noted in table A.15 below, there are 13 priority refuge resources of concern (PRRC) terrestrial and aquatic species that may rely upon the diverse habitats in this CFA, one of which is a Federal candidate species and another that is listed as Federal endangered. There are also habitat types that are not being managed for a particular PRRC species, but are important for their contribution to Biological Integrity Diversity and Environmental Health (BIDEH) of the landscape. This includes extensive tidal wetlands which are part of the Connecticut River estuary system. These wetlands provide habitat for a diversity of species including shorebirds, waterbirds, and waterfowl. The refuge will seek to protect and restore (if necessary) these wetlands and other habitat types. Additionally, we recognize the value of this area to migratory species, forest interior nesting species, and State Species of Greatest Conservation Need (SGCN). These species and others are discussed further below.

1. Federal Threatened and Endangered Species

The Whalebone Cove CFA is one of 49 New England cottontail Focus Areas (NECFA) in 6 states. These focus areas are locations to manage and restore habitat for New England cottontail. New England cottontail is a candidate species for listing under the Endangered Species Act, and is a species of greatest conservation need in Connecticut. “A Conservation Strategy for the New England cottontail” was developed and approved in November 2012, and provides the conservation and habitat management goals and strategies for this species (Fuller and Tur 2012). We plan to work with partners and adjacent landowners to identify areas appropriate for New England cottontail management. We will manage approximately 375 acres of forest in early successional habitat for New England cottontail in the CFA. This approximation of the amount and distribution of acreage over the next 15 years assumes we would have a large enough land base to manage. Our target acreage may also be refined once site conditions are verified and a habitat management plan is completed.

Juvenile Atlantic sturgeon were recently documented in the lower portion of the Connecticut River (S. Gephart, CTDEEP, personal communication 2015). This Federal endangered species and a species of greatest conservation need in Connecticut, were once considered extirpated in the Connecticut River, as reproduction no longer occurred in the main stem (Sprinkle personal communication 2014). The documentation of juveniles provides a higher probability and opportunities for recovery of this species in the Connecticut River.

2. Migratory Birds

The Connecticut River watershed is a major migration corridor. The lower portion of the watershed (CT and MA) receives higher use by migrants, with this use concentrated in habitats along the Connecticut River main stem (Smith College 2006). The Whalebone Cove CFA is situated on the Connecticut River, and the forested habitat and tidal wetlands provide very important stopover and breeding habitat for landbirds and waterbirds.

The PRRC species for the Whalebone Cove CFA include wood thrush and Louisiana waterthrush. This CFA is located within their core breeding range, and the contiguous forests provide breeding habitat for these and other forest nesting birds, many of which are priority conservation concern species. In fact, Audubon has included the Eightmile River Watershed (within the CFA) as a focal area for forest conservation efforts due to a high concentration of forest nesting birds (P. Comins, Audubon Connecticut, personal communication 2013). Blue-winged warbler is also a PRRC species, which relies on early successional forests and shrublands in the CFA, habitats in decline throughout the southern portion of the Connecticut River watershed.

Osprey and bald eagle are also PRRC species for this CFA. The open water habitats within the lower Connecticut River constitute the core of breeding osprey in the State, and supports nesting bald eagles, as well as a significant wintering bald eagle population. The mudflats of the river, creeks and coves, provide foraging habitat for shorebirds and wading birds including willets and lesser and greater yellow-legs. Snowy egrets, a PRRC and state species of concern also use these wetlands as foraging areas. In addition, the freshwater tidal wetlands in the lower Connecticut River, and CFA, also provide significant stopover habitat, and potentially breeding habitat, for rails including Virginia, sora, and king rails.

3. Waterfowl

The large tidal wetland complexes in the Whalebone Cove CFA provide excellent food sources for a diversity of waterfowl (TNC 2013). Large concentrations of American black ducks (a PRRC species) occupy habitats during migration and the winter. And located on the Connecticut River, an important migration corridor, these habitats are used by other waterfowl species during migration including green-winged teal, common merganser, mallards, bufflehead, and wood ducks.

4. Diadromous fish and other aquatic species

Whalebone Cove CFA aquatic habitats are among the highest in quality of the shallow fresh water bays, coves, tidal creeks, and tributaries which typify the Lower Connecticut River and the significant overwintering, spawning and feeding habitat they provide for a large number of fish species. Many species of conservation concern use these aquatic habitats including PRRC species like American eel, alewife, the Federal listed Atlantic sturgeon, blueback herring, and brook trout.

Many of the tidally influenced coves and creeks provide important spawning habitat for alewife and blueback herring. These creeks also provide excellent nursery habitat for these species. American eel also occupy tidally influenced aquatic systems, as well as the non-tidal rivers. Brook trout occur in the upland portions of the CFA, where free-flowing cold water habitat is present, and a requirement for this species life cycle. Juvenile Atlantic sturgeon were documented recently in the lower portion of the CT River. Sea lamprey, another species of conservation concern, occurs in this CFA providing important ecological benefits to aquatic systems.

5. Wetlands

From a regional standpoint, there are no areas in the Northeast that support such extensive or high quality fresh and brackish tidal wetland systems as those in the Connecticut River estuary. The lower Connecticut River wetlands and river area consists of over 20 individual tidal wetland units and river islands of various sizes occurring along a 40-mile (64 kilometer) stretch of the lower Connecticut River from Old Saybrook to Cromwell. In particular, Whalebone Cove is one of the most undisturbed and biologically significant freshwater marshes along the Connecticut River (TNC 2013). Taken as a whole, the estuary represents a gradation of tidal wetlands from a very narrow zone of relatively high salinity marshes at the mouth of the Connecticut River where it enters Long Island Sound, through an intermediate zone of brackish, lower salinity wetlands, to extensive freshwater tidal marshes and floodplain forests beginning at Deep River and extending upriver to Cromwell (Comins personal communication 2013).

There are 455 acres of freshwater tidal emergent wetlands and 138 acres of shrub-swamp and floodplain forest at the mouth of creeks and within secluded coves of the Whalebone Cove CFA. Whalebone Cove has one of the largest stands of wild rice in the State. These tidal wetlands are part of the Connecticut River estuary, and provide habitat for a diversity of species. Further in land there are also 93 acres of scattered hardwood swamps.

What habitat management activities would likely be a priority on refuge lands within the proposed CFA?

We will conduct a comprehensive, multi-scale wildlife habitat inventory following acquisition. Baseline information on the condition of habitats (e.g., forested, non-forested and open water habitats) will further inform more detailed, habitat prescriptions within a required step-down Habitat Management Plan. Once inventory has been completed, then management will focus on maintaining the following conditions:

- Forest management activities will provide diversity of seral stages including early successional and mature forested habitats. The forests in the CFA will be structurally diverse and appropriate for site conditions and location. Appendix J provides general forest management guidelines, including descriptions of forestry techniques and explanations about how we will determine where and how to conduct active management.
- We will also manage wetland habitats, and pasture, hay, grassland habitats. Wetland management will focus on maintaining the natural hydrology and native species composition. Invasive plant management will be a priority.
- In open water (stream, rivers, coves) habitats, will focus on maintaining in-stream connectivity and outstanding water quality.

What public use opportunities would likely be a priority on refuge lands within the proposed CFA?

We would focus on providing opportunities for the six, priority public uses, if determined compatible for the Whalebone Cove Division: wildlife observation, wildlife photography, environmental education, interpretation, hunting, and fishing.

Were there other special considerations in delineating the CFA boundary?

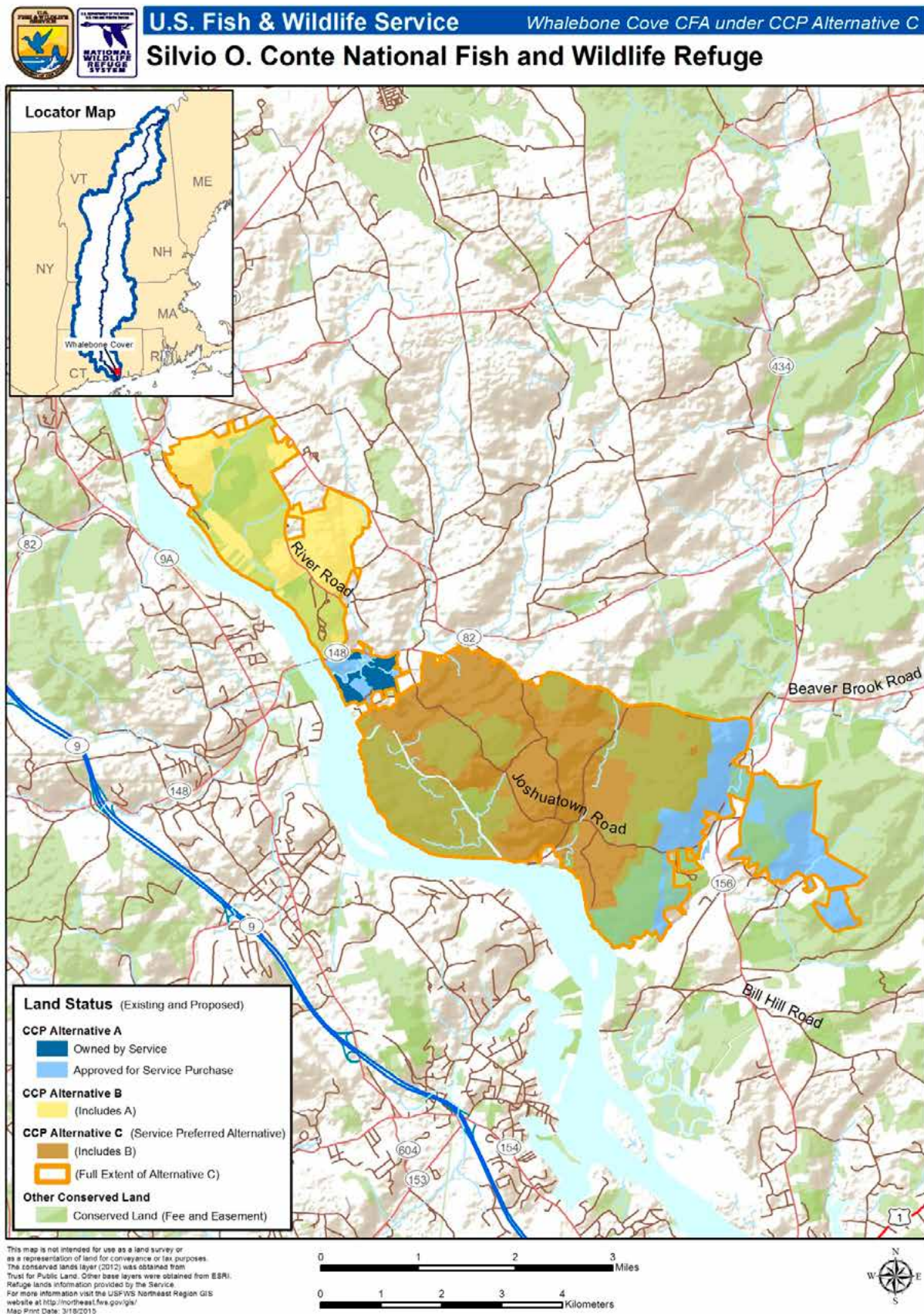
The lower portion of the Eightmile River occurs in the CFA. Fifteen miles of the Eightmile River and its East Branch are included on the National Park Service's Nationwide Rivers Inventory of potential Wild and Scenic River segments. Both segments are included on the inventory for outstanding scenic, geologic, fish and wildlife values. In 2001, Congress passed Public Law 107-65 authorizing a study of the Eightmile River to determine if it meets established criteria for designation as an addition to the National Wild and Scenic River (WSR) System. This is the first step to formally including the River in the WSR. To date, Study partners have identified six criteria that make the Eightmile River a special natural resource:

- (1) The presence of unique species of plants and animals, and unique natural communities.
- (2) Outstanding water quality and quantity.
- (3) Exemplary hydrology systems.
- (4) Unique geology.
- (5) An outstanding cultural landscape, including Native American settlement dating back to at least 6,000 to 4,000 BC, varied uses of the landscape since the time of European settlement, and its high potential for intact archaeological resources.
- (6) An intact functioning watershed ecosystem.

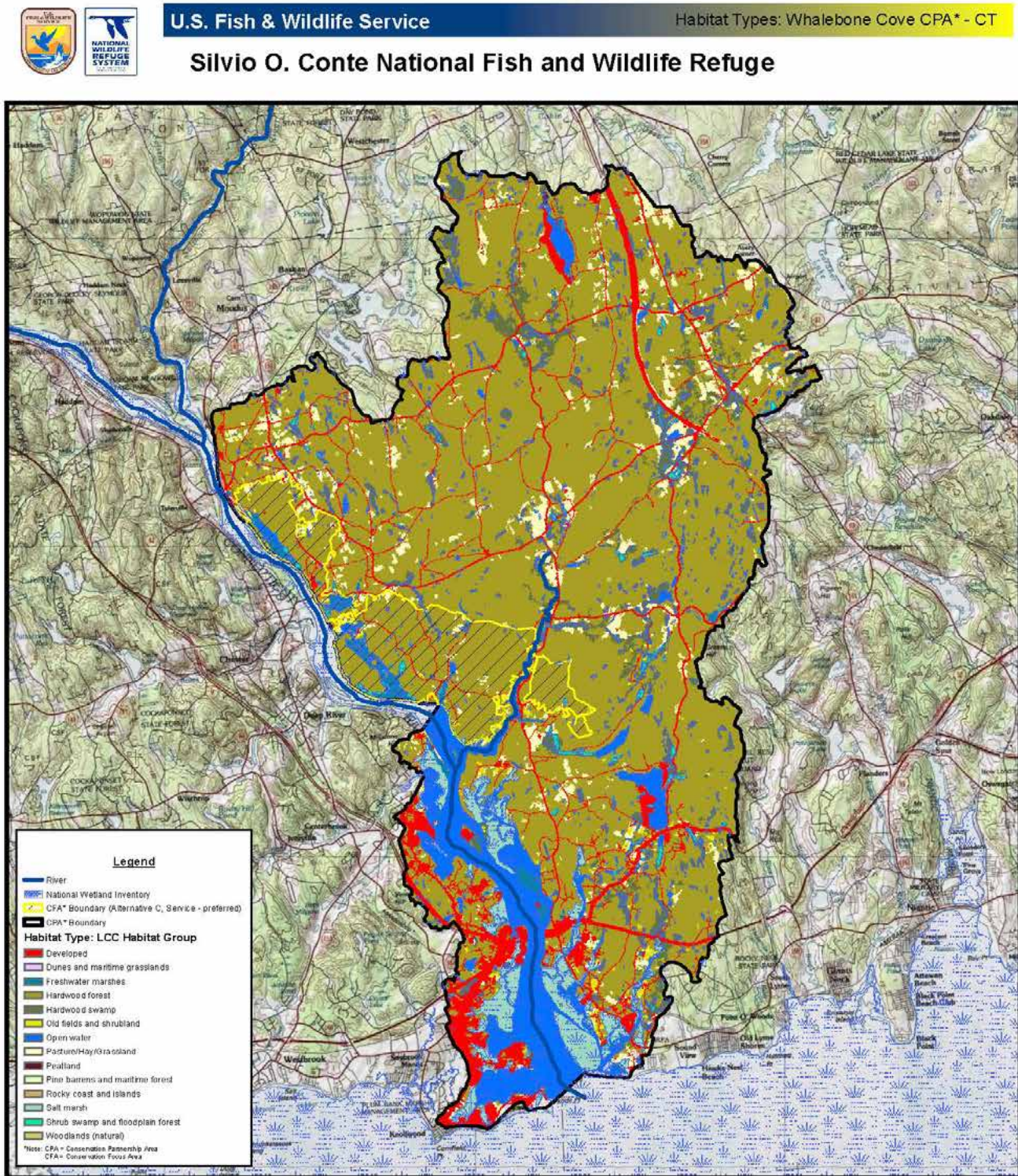
The Eightmile River Watershed is a critical ecosystem in Connecticut. The River contains exceptionally high quality forest, aquatic, and early successional habitats that make it a critical region for birds and other wildlife in Connecticut. The Nature Conservancy and other groups collectively protect almost a quarter of the 40,000-acre watershed. The Eightmile River is located within the Lower Connecticut River Valley—a region named as one of the 40 Last Great Places in the Western Hemisphere by The Nature Conservancy in 1993. This area has also been designated a Ramsar wetland of international importance.

The Eightmile River represents a remarkably intact, free flowing and virtually unobstructed riverine ecosystem with excellent water quality and 85% forest cover. Because of the exceptional water quality and lack of migratory obstructions such as dams, the river system contains exceptional habitat for anadromous and catadromous fish species.

Map A.15. Whalebone CFA – Location.



Map A.16. Whalebone CPA/CFA – Habitat Types.



This map is designed for refuge management.
It is not intended for use as a land survey or
as a representation of land for conveyance or tax purposes.
For more information visit the USFWS Northeast Region GIS
website at <http://northeast.fws.gov/gis/>
Date: 7/2/2013

0 0.5 1 2 3 4
Miles



Table A.14. Whalebone CPA/CFA – Habitat Types.

LCC General Habitat Type ¹	CPA ²		CFA ³				Percent Habitat ⁸
	Total Acres	Percent of CPA ⁴	Total Acres	Conserved by Others ⁵	USFWS Owned ⁶	Percent CFA ⁷	
Forested Uplands and Wetlands ⁹							
Hardwood forest	54,447	66.2%	5,607	2,546	0	80.5%	10.3%
Hardwood swamp	5,537	6.7%	93	20	0	1.3%	1.7%
Pine barrens and maritime	89	0.1%	0	0	0	0.0%	0.0%
Shrub swamp and floodplain forest	603	0.7%	138	94	0	2.0%	22.9%
Woodlands (natural)	13	0.0%	2	0	0	0.0%	18.6%
Forested uplands and wetlands subtotal	60,689	73.8%	5,841	2,660	0	83.8%	9.6%
Non-forested Uplands and Wetlands ⁹							
Freshwater marshes	1,254	1.5%	455	312	0	6.5%	36.3%
Old fields and shrubland	429	0.5%	49	23	0	0.7%	11.5%
Pasture/hay/grassland	3,992	4.9%	177	39	0	2.5%	4.4%
Peatland	15	0.0%	0	0	0	0.0%	0.0%
Non-forested uplands and wetlands subtotal	5,689	6.9%	681	375	0	9.8%	12.0%
Inland aquatic habitats ⁹							
Open Water	5,645	6.9%	170	57	0	2.4%	3.0%
Inland aquatic habitats subtotal	5,645	6.9%	170	57	0	2.4%	3.0%
Coastal non-forested uplands ⁹							
Dunes and maritime grasslands	100	0.1%	0	0	0	0.0%	0.0%
Rocky coast and islands	56	0.1%	42	33	0	0.6%	74.6%
Coastal non-forested uplands subtotal	156	0.2%	42	33	0	0.6%	26.7%

LCC General Habitat Type ¹	CPA ²		CFA ³				
	Total Acres	Percent of CPA ⁴	Total Acres	Conserved by Others ⁵	USFWS Owned ⁶	Percent CFA ⁷	Percent Habitat ⁸
Coastal wetlands and aquatic habitats ⁹							
Salt marsh	2,571	3.1%	5	5	0	0.1%	0.2%
Coastal wetlands and aquatic habitats subtotal							
Other							
Developed	7,530	9.2%	230	63	0	3.3%	3.1%
Other subtotal	7,530	9.2%	230	63	0	3.3%	3.1%
TOTAL	82,282	100.0%	6,967	3,192	0	100.0%	8.5%

**All acreages are based upon GIS analysis and should be considered estimates

1 - North Atlantic Landscape Conservation Collaborative general habitat typings for USFWS representative species; linked to the National Vegetation Classification System (NVCS). See table A.52 at the end of this appendix for a comparison of these generalized habitat types with the more specific The Nature Conservancy's Northeastern Terrestrial Habitat Classification System. More detailed habitat tables that include the Northeastern Terrestrial Habitat Classification System habitat types are available for each CFA and refuge unit online at: http://www.fws.gov/refuge/Silvio_O_Conte/what_we_do/conservation.html.

2 - Conservation Partnership Area

3 - Conservation Focus Area; representing Service - preferred Alternative C

4 - Percentage of the CPA represented by the habitat type

5- Acres in the CFA currently conserved by others (TNC 2012)

6 - Acres in the CFA currently owned by the USFWS

7 - Percentage of the CFA represented by the habitat type

8 - Percentage of a given habitat within the CPA protected within the CFA under Alternative C

9 - CCP Objective from Silvio O. Conte NFWR Draft CCP/EIS, Chapter 4, Alternative C-Service's Preferred Alternative

Table A.15. Whalebone Cove CFA – Preliminary Priority Refuge Resources of Concern

Priority Refuge Resources of Concern ¹	Habitat Structure ²	Associated Species ³
Forested Uplands and Wetlands⁴		
Hardwood Forest⁵ - 5,607 acres		
Wood Thrush^{A, B, C}	Breeding habitat includes contiguous mature forests (80+ years old) dominated by deciduous tree species, moist soils, a moderate to dense sub-canopy and shrub density, open forest floor and closed canopy (Roth et al. 1996, Rosenberg et al. 2003).	Eastern Towhee ^{A,I} Black-billed Cuckoo ^{I,J} Broad-winged hawk ^{A,I,J} Blue-winged Warbler ^{A,I} Great-crested Flycatcher ^{A,I}
Louisiana Waterthrush^A	Breeding habitat includes contiguous (250+ acres) mature deciduous or mixedwood forests along medium to high-gradient, first to third-order, perennial streams (Mattsson et al. 2009, Degraaf et al., 2001).	Hooded Warbler ^{I,J} Sharp-shinned Hawk ^{I,J} Yellow-throated Vireo ^{A,I,J} Eastern Red Bat^I Ovenbird^I
Blue-winged Warbler ^{A,B,I}	Breeding habitat includes fields scattered with shrubs and small trees, or young deciduous and mixed forests 1-20 years old (DeGraaf et al. 2001, Gill et al. 2001)	American Woodcock ^{A,I} Gray Catbird ^{A,I,J} Eastern Box Turtle ^I Acadian Flycatcher ^{I,J}
New England cottontail ^{B, D}	Year round habitat includes dense, young deciduous and mixed forests in patch sizes of 25 acres or more that are situated within 1 km of each other (Arbuthnot 2008, DeGraaf et al. 2001).	Scarlet Tanager ^{A,I,J} Black-and-white Warbler ^{A,I,J} Baltimore Oriole ^{A,I,J} Prairie Warbler ^{A,I}
Bald Eagle ^{C, G} Osprey ^G (breeding and migrating only)	Breeding, migrating and wintering habitat includes large bodies of open water with little human disturbance, and large canopy trees or other elevated sites for nesting, perching, and roosting (DeGraaf et al. 2001).	Worm-eating Warbler ^{I,J} Northern Flicker ^{A,I,J} Cerulean Warbler ^{A,I,J} Ruffed Grouse ^I Whip-poor-will ^{A,I} Chestnut-sided Warbler^I Migratory Species
Hardwood Swamp⁵ - 93 acres		
North-Central Appalachian acidic swamp ^H North-Central Interior and Appalachian rich swamp ^H	Eastern hemlock is usually present and may be dominant in the <i>North-Central Appalachian acidic swamp system</i> . It is often mixed with deciduous wetland trees such as red maple or black tupelo. Species of the genus Sphagnum are an important component of the moss layer. <i>North-Central Interior and Appalachian rich swamps</i> are found in basins where higher pH and/or nutrient levels are associated with a rich flora. Species include red maple, black ash, as well as calcium loving (calciphilic) herbs. Conifers include American larch, but typically not Northern white cedar, which is characteristic of more northern wetland systems. There may be shrubby or herbaceous openings within the primarily wooded cover. The substrate is primarily mineral soil, but there may be some peat development (Gawler 2008).	Uncommon plant community within the landscape that contributes to BIDEH*

Priority Refuge Resources of Concern ¹	Habitat Structure ²	Associated Species ³
Forested Uplands and Wetlands⁴		
Shrub Swamp and Floodplain Forest⁵ - 138 acres		
New England cottontail ^{B, D}	Year-round habitat includes shrub swamps of at least 25 acres that are within 1 km of other shrub swamps, and early successional forest patches (Arbuthnot 2008, DeGraaf et al. 2001).	American Redstart ^{I, J} Gray Catbird ^{A, I, J} Chestnut-sided Warbler ^I Migratory Species
American Black Duck ^{A, B, C, G}	Breeding and migrating habitat includes herbaceous wetlands, fens, and flooded meadows and shrub-swamps (Longcore et al. 2000, DeGraaf et al. 2001).	Willow Flycatcher^{A, I} American Woodcock ^{A, I} Rusty Blackbird ^A Warbling Vireo^I Spotted Turtle^I Eastern Kingbird ^{A, I, J}
Woodlands (natural)⁵ - 2 acres		
Central Appalachian pine-oak rocky woodland ^H	This system of the central Appalachians encompasses open or sparsely wooded hilltops and outcrops or rocky slopes. The substrate rock is granitic or of other acidic lithology. The vegetation is patchy, with woodland as well as open portions. Pine species are indicative and often are mixed with Oak species. Some areas have a fairly well-developed heath shrub layer; others a grass layer. Conditions are dry and nutrient-poor; and many, if not most, sites have a history of fire (Gawler 2008).	Uncommon plant community within the landscape that contributes to BIDEH*
Non-Forested Uplands and Wetlands⁴		
Freshwater Marshes⁵ - 455 acres		
American Black Duck ^{A, B, C, G}	Breeding and migrating habitat includes herbaceous wetlands, fens, and flooded meadows and shrub-swamps (Longcore et al. 2000, DeGraaf et al. 2001). Wintering habitat includes open water, such as, estuaries, coves or bays with submerged aquatic vegetation, mollusks and crustaceans for foraging, as well as tidal wetlands (DeGraaf et al. 2001)	Northern Harrier ^{I, J} Wood Duck ^{A, I, J} Green-winged Teal ^{A, I, J} Great Blue Heron ^I American Bittern^{A, I} Bufflehead ^A Canada Goose, NAP ^{A, J} Canada Goose, AP ^{A, J}
Snowy Egret ^{A, C, I, J}	Foraging habitat includes shallow pools, freshwater wetlands, and tidal flats within the vicinity of nesting areas (DeGraaf et al. 2001).	Virginia Rail^I Marsh Wren^{A, I} Mallard ^{A, I, J} Lesser Yellowlegs ^{A, J}
Old Fields and Shrublands⁵ - 49 acres		
New England Cottontail ^{B, D}	Year round habitat includes pastures, abandoned fields, and dense, young deciduous and mixed forests in patch sizes of 25 acres or more that are situated within 1 km of each other (Arbuthnot 2008, DeGraaf et al. 2001).	American Woodcock ^{A, I, J} Eastern Towhee ^{A, I} Gray Catbird ^{A, I} Bobolink^I Eastern Meadowlark^I Blue-winged Warbler^{A, I} Prairie Warbler ^{A, I} Brown Thrasher^{A, I} Field Sparrow^{A, I} Eastern Kingbird ^{A, I} Chimney Swift ^{A, I} Northern Harrier ^{I, J} Indigo Bunting ^{I, J} Migratory Species
Blue-winged Warbler ^{A, B, I}	Breeding habitat includes fields scattered with shrubs and small trees, or young deciduous and mixed forests 1-20 years old (DeGraaf et al. 2001, Gill et al. 2001)	

Priority Refuge Resources of Concern ¹	Habitat Structure ²	Associated Species ³
Non-Forested Uplands and Wetlands⁴		
Pasture/Hay/Grassland⁵ – 177 acres		
New England Cottontail ^{B, D}	Year round habitat includes pastures, abandoned fields, and dense, young deciduous and mixed forests in patch sizes of 25 acres or more that are situated within 1 km of each other (Arbuthnot 2008, DeGraaf et al. 2001).	American Woodcock ^{A, I, J} Eastern Towhee ^{A, I} Gray Catbird ^{A, I} Bobolink^I Eastern Meadowlark^I Blue-winged Warbler^{A, I} Prairie Warbler ^{A, I} Brown Thrasher^{A, I} Field Sparrow^{A, I} Eastern Kingbird ^{A, I} Chimney Swift ^{A, I} Northern Harrier ^{I, J} Indigo Bunting ^{I, J} Migratory Species
Inland Aquatic Habitats⁴		
Open Water⁵ – 170 acres		
Blueback Herring ^{F, G}	Spawn in fast moving, shallow water when the river temperature is about 58 F (USFWS 1996).	Sea Lamprey ^I Bridle Shiner ^I Pumpkinseed ^I Striped Bass ^I Longnose Dace ^I Yellow Perch ^I Banded Sunfish ^I White Perch ^I
Alewife ^{B, F, G}	Spawn in ponds and slow-moving streams (USFWS 1996).	
Brook Trout ^F	Spawning habitat includes clear, well oxygenated cold water lakes/ponds/streams with silt-free rocky substrate, abundant cover, vegetated banks, stable temperatures and stream flow (VTWAP 2005).	
American Eel ^{E, F}	Migrating and feeding habitat includes lakes, streams and large rivers (USFWS 1996)	
American Black Duck ^{A, B, C, G}	Migrating and wintering habitat includes open water, such as, estuaries, coves or bays with submerged aquatic vegetation, mollusks and crustaceans for foraging (DeGraaf et al. 2001).	Canada Goose, Atlantic ^A Canada Goose, North Atlantic ^A Bufflehead^A Mallard ^A Snowy Egret ^{A, I, J} Bald Eagle ^{A, I} Wood Duck ^A Green-winged Teal ^A
Coastal Non-forested Uplands⁴		
Rocky Coast and Islands⁵ – 42 acres		
Acadian-North Atlantic rocky coast ^H	This system encompasses non-forested uplands that are often a narrow zone between the high tide line and the upland forest; this zone becomes wider with increasing maritime influence. The substrate is rock, sometimes with a shallow soil layer, and tree growth is prevented by extreme exposure to wind, salt spray, and fog. Slope varies from flat rock to cliffs. Cover is patchy shrubs, dwarf-shrubs and sparse non-woody vegetation, sometimes with a few stunted trees. Many coastal islands have grass-shrub areas that were maintained by sheep grazing and now persist even after grazing has ceased (Gawler 2008).	Uncommon plant community within the landscape that contributes to BIDEH*

Priority Refuge Resources of Concern ¹	Habitat Structure ²	Associated Species ³
Coastal Wetlands and Aquatic Habitats⁴		
Salt marsh⁵ – 5 acres		
Northern Atlantic coastal plain tidal salt marsh ^H	This system encompasses intertidal marshes where salinity levels are between 5 and 50 (ppt). It includes a number of different broad vegetation types including salt pannes (depressions within a salt marsh that flood during high tide), salt marshes, and salt shrublands. The typical salt marsh profile, from sea to land, can be summarized as follows: a low regularly flooded marsh strongly dominated by smooth cordgrass; a higher irregularly flooded marsh dominated by salt meadow cordgrass and sea shore saltgrass; low hyper-saline pannes characterized by glasswort spp.; and a salt scrub ecotone characterized by Jesuit's bark, eastern baccharis, and switchgrass. Moving up a tidal river, brackish marshes have less cover of salt meadow cordgrass and increased cover of associated species including tall grasses such as chair maker's bulrush and narrow-leaf cattail (Gawler 2008).	Uncommon plant community within the landscape that contributes to BIDEH*

1 - These species of conservation concern and associated habitats, as well as under-represented and sensitive ecological systems constitute the management focus for the CFA, and recommended for the CPA. They were identified based on specific criteria, and are included in the following plans, databases and/or have Federal status.

A: 2008 Bird Conservation Region 30.

B: 2009 North Atlantic Landscape Conservation Cooperative Development and Operations Plan.

C: 2008 USFWS Birds of Conservation Concern.

D: Federal Threatened and Endangered status as of 2010, including Candidate Species

E: Federal Elevated Concern species or species petitioned for threatened and endangered listing as of 2010

F: 2009-2013 USFWS Northeast Region Fisheries Program Strategic Plan

G: Silvio O Conte Refuge Purpose Species.

H: 2008 Northeastern Terrestrial Habitat Classification System.

2 - This habitat structure will benefit the listed priority refuge resources of concern, and is based on the most recent literature.

3 - These species are a compilation from the following plans, and are associated with the habitat type and/or will benefit from all or a portion of the habitat structure associated with the priority species. This is not a comprehensive list of species.

A: 2008 Bird Conservation Region 30.

I: 2005 Connecticut Comprehensive Wildlife Conservation Strategy

J: 2012 Terrestrial and Wetland Representative Species of the North Atlantic: Species Selected, Considered, and Associated Habitats (Ecological Systems). These species were LCC candidate species and are represented by the selected LCC Representative Species.

4 - CCP Objectives from Silvio O. Conte NFWR Comprehensive Conservation Plan, Chapter 4, Service - preferred Alternative.

5 - These habitat types are based on the North Atlantic Landscape Conservation Cooperative (NALCC) habitat groupings for associated Representative Species, which were derived from The Northeastern Terrestrial Habitat Classification System (NETHCS). See table A.52 for a comparison of the NALCC habitat groupings and NETHCS.

BOLD - These species are LCC Representative Species, which is a species that, because of its habitat use, ecosystem function, or management response, typifies lifecycle or habitat requirements for a larger group of species.

* The Refuge Improvement Act directs the US Fish and Wildlife Service to maintain Biological Integrity, Diversity, and Environmental Health (BIDEH). Elements of BIDEH are represented by native fish, wildlife, plants and their habitats as well as those ecological processes that support them.

Goals, Objectives, and Strategies for Refuge Lands in the Whalebone Cove CFA under Alternative C

Goal 1: Wildlife and Habitat Conservation: Promote the biological diversity, integrity, and resiliency of terrestrial and aquatic ecosystems within the Connecticut River watershed in an amount and distribution that sustains ecological function and supports healthy populations of native fish, wildlife, and plants, especially Federal trust species of conservation concern, in anticipation of the effects of climate, land use, and demographic changes.

Objective 1.1: Forested Uplands and Wetlands

Sub-objective 1.1a. (Hardwood Forest)

Improve the diversity of seral stages and (where and when possible) restore historic composition and structure, and improve landscape connectivity of hardwood forest habitat to support species of conservation concern and aid in climate change adaptation. Management will provide breeding and foraging habitat for priority refuge resources of concern, including wood thrush, Louisiana waterthrush, New England cottontail, blue-winged warbler, osprey, and bald eagle.

Rationale:

We envision healthy forests within the Whalebone Cove CFA where a diverse seral structure provides suitable breeding and post-breeding habitat conditions for a suite of Connecticut wildlife. Our long-term vision for the CFA includes hardwood forests characterized by complex horizontal and vertical structure, a generally closed canopy, large-diameter trees, dead woody material, snags and cavity trees, native species diversity, softwood inclusions, and a diversity of wildlife (Foster et al. 1996, Goodburn and Lorimer 1998, Keeton 2006, D'Amato et al. 2009, Curzon and Keeton 2010, Fraver et al. 2011).

Whalebone Cove CFA hardwood forests are among the most diverse and productive for wildlife, and abundant, high-quality habitat is certainly available within the CFA. To date our review of the Whalebone Cove CFA habitats and wildlife species—and their condition—has been limited to coarse-scale information: the careful analysis of spatially-explicit habitat data using GIS, the consultation of local, state, and regional species conservation plans, and an understanding of forest disturbance and land-use history in New England. This allowed identification of broad habitat types, and species of conservation concern known to utilize characteristics common to these habitats. Our understanding of the forest structure within Whalebone Cove comes exclusively from a reading of forest history in New England—a legacy of intensive past-use that altered the vegetation structure and composition, landscape patterns, and ongoing ecological dynamics (Cronon 1983, Whitney 1996, Foster et al. 1997, Bellemare et al. 2002, Hall et al. 2002). Our sub-objective assumes the forests of the Whalebone Cove are more homogeneous than those of three centuries earlier, and include more sprouting and shade-intolerant species and fewer long-lived mature forest tree species (Goodburn and Lorimer 1998, Foster et al. 1998, Foster 2000, Bellemare et al. 2002, Cogbill et al. 2002, Abrams 2003). Completing a comprehensive forest and habitat inventory post-acquisition will test these assumptions, and aid in identifying stands where a forest management approach that combines passive management and the application of silvicultural treatments designed to emulate gap dynamics, will promote compositional and structural diversity, and move succession forward to emulate later seral stage characteristics.

For many species, the ability to survive and breed is often related to the presence of specific forest structural conditions or attributes, such as those that provide nest sites, food and foraging substrates, singing perches, and cover from predators. While our management goals may create a relatively old forest, hardwood forests within Whalebone Cove will contain a variety of patches in different age classes and developmental stages; it is not uniform throughout. This diversity of age classes provides a variety of species with a range of nesting and foraging opportunities. Further, finer-scale investigation of forest conditions may identify opportunities to improve age class diversity through the creation of early-successional forests—a habitat in decline in portions of the watershed. The USFWS New England cottontail initiative has identified focus areas, including the Whalebone Cove CFA, where the decline in early successional habitats is a particular problem for the New England cottontail. New England cottontail is petitioned for listing under the ESA, and is a species of greatest conservation need in Connecticut.

The conceptual model for the conservation of New England cottontail is for a focus area to contain at least 1,000 acres of early successional habitat of fifteen or more habitat patches, several of which are 25 acres or more. Each habitat patch should be one mile or less from each other to aid in New England cottontail movement between patches (Fuller and Tur 2012). Approximately 375 acres of forest will be managed in early successional habitat in support of New England cottontail in the CFA. Another species of conservation concern that will use these habitat patches is American woodcock. High quality woodcock habitat includes young forest patches within a mile of feeding areas. New England cottontail habitat patches will be placed in the vicinity of shrub wetlands, where feasible, to benefit this species. If early successional habitat is lacking within the landscape, we will provide other strategically located patches with these conditions to support other species of conservation concern such as blue-winged warbler, chestnut-sided warbler, gray catbird, eastern towhee, black and white warbler, eastern red bat, and ruffed grouse (DeGraaf et al. 2006).

In a mature forest, many nesting bird species tend to remain within specific vegetation layers: on or near the ground, in the middle layer, or up in the canopy. Hardwood forests within the Whalebone Cove CFA should have all forest layers present in moderate to high amounts distributed throughout a stand and across the landscape. Enhanced vertical structure will provide the greatest number of bird species with the greatest number of nesting and foraging opportunities. Patches of very dense native shrub and understory layers (0-5 feet in height) are of particular importance. These habitat elements may have importance to declining mature forest-interior species identified in regional conservation plans like wood thrush and Louisiana waterthrush. Wood thrush nest and feed at the ground level; a sub-canopy layer of shrubs, moist soils and leaf litter are important habitat features (Roth et al. 1996, Rosenberg et al. 2003). And wood thrush has significance as a NALCC representative species for hardwood forests in the NALCC southern sub-region. Louisiana waterthrush prefer a dense, multilayer forest canopy—particularly along high-gradient streams—for protection from nest predation.

Our active forest management efforts will aim to create or maintain a canopy that is generally closed (greater than 75 to 80 percent closure) with small gap openings scattered throughout a stand and the CFA. These openings will be caused by or mimic small, single- to few-tree disturbances and create opportunities for regenerating intermediate- and shade-tolerant species. Regeneration in these openings will provide a continual supply of ephemeral nesting habitat for species like wood thrush. The distribution and concentration of these openings will vary, but interior forest conditions will be maintained on the whole. Closed canopy conditions favor a suite of interior-nesting bird species that include: ovenbird, acadian flycatcher, and—when along rocky bottomed streams—Louisiana waterthrush. Efforts to regenerate any portion of forest within the CFA must account for the abundance of invasive understory species and risk of regeneration failure from white-tailed deer overbrowsing (Hochholzer 2010).

Efforts to maintain or improve seral stage diversity within the CFA will include the retention of large-diameter (24 inches or greater dbh) trees where appropriate. Such larger trees are either absent or are very few in younger forests, and that has implications for the habitat of wildlife species and for nutrient cycling. Structurally-sound, large-diameter trees are important nest sites for woodland raptors, such as the sharp-shinned hawk. Emergent white pines—tall, large-diameter trees that extend above the canopy— provide special habitats that, when near open bodies of water, are utilized by bald eagles and osprey. Standing trees that are dead and/or contain cavities will be present in all size classes for those species, like black bear, that require large logs or trees for their dens (Wynne and Sherburne 1984, Chapin et al. 1997, DeGraaf and Yamasaki 2001). Snags and cavity trees also provide important nesting and foraging sites for bird species such as nuthatches, barred owls, and woodpeckers, like the northern flicker.

Implementation of refuge strategies will begin with a comprehensive, multi-scale forest and wildlife habitat inventory. Forest wildlife species survival and breeding success is dependent not only on the habitat at the stand level, but also the surrounding landscape, making it necessary to consider the proportions and sizes of stand types and successional stages within the CFA and the associated landscape. Baseline information on the condition of hardwood forests at the time of acquisition will further inform more detailed, stand-level habitat prescriptions within a required step-down HMP.

Management Strategies:

Within 5 years of CCP approval:

- Identify forest stands with late successional characteristics for passive management, and those where active management is necessary to improve forest structure. Appendix J provides general forest management guidelines, including descriptions of forestry techniques and explanations about how we will determine where and how to conduct active management.

- Work with partners and adjacent landowners to identify areas appropriate for New England cottontail management. Plan to manage approximately 375 acres of forest in early successional habitat for New England cottontail in the CFA. This approximation of the amount and distribution of acreage over the next 15 years assumes we would have a large enough land base to manage. Our target acreage may also be refined once site conditions are verified and a habitat management plan is completed.
- Work with partners, including CTDEEP in support of the State Wildlife Action Plan, to ensure management on Service lands complement adjacent land management objectives.

Within 10 years of CCP approval:

- Implement identified active forest management opportunities using accepted silvicultural practices.
- Protect hard and soft mast producing species such as American beech, and apple and cherry trees, through the use of best management practices.
- Ensure a diversity of native species is present and non-native species are excluded or managed to keep population levels as low as possible.
- Explore research opportunities with academic partners to address efficacy of forest management in meeting wildlife objectives.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Conduct forest and wildlife inventories.
- Map natural communities; protect rare or exemplary examples.
- Map vernal pools and seeps.

Sub-objective 1.1b. (Shrub Swamps and Floodplain Forests)

Manage shrub swamp and floodplain forest communities to support natural and rare ecological communities, and provide habitat for priority refuge resources of concern including American black duck and New England cottontail.

Rationale:

Shrub swamps are restricted to poorly drained areas, small seepage zones, and wide alluvial stretches of rivers and small streams. Shrubs tend to dominate the wetland, though grasses may be present. Typical species include willow, silky dogwood, speckled alder, white meadowsweet, bluejoint, tall sedge, and common rush. Our coarse-scale habitat analysis of this CFA identifies shrub swamps scattered in pockets across the CFA, but appear to be more concentrated in a wetland complex, consisting of shrub swamp and freshwater marsh communities, at the mouth of Joshua and Whalebone Creeks, and on the perimeter of Selden Creek and Chapman Pond. These tide influenced wetlands, and those that are not influenced by tide events, provide a diversity of plant communities, and habitats for a variety of wildlife species, including American black duck and, potentially, New England cottontail.

New England cottontail is a candidate species for listing under the Endangered Species Act, and is a species of greatest conservation need in Connecticut. The historic range of this species likely included southeastern New York, north through the Champlain Valley and into southern Vermont, New Hampshire, and Maine, and statewide in Massachusetts, Connecticut, and Rhode Island. Due to loss of early successional habitat to development and forest maturation, this species occupies less than a fifth of its historical range (Fuller and Tur 2012). New England cottontail is no longer sustaining a viable population, and given this conservation urgency, a range-wide New England cottontail Initiative was established. This initiative involves collaboration from multiple agencies, including the USFWS, state wildlife agencies, Universities, Natural Resources Conservation Service, The Nature Conservancy, and Wildlife Management Institute, to address cottontail conservation on a landscape scale.

Focus areas were identified as locations to manage and restore habitat for New England cottontail. The Whalebone Cove CFA was one of forty-nine focus areas in six states. Early successional management and protection of adjacent natural shrubland habitat, such as shrub swamps, will meet the conservation goals set for the New England cottontail. "A Conservation Strategy for the New England cottontail" was developed and approved in November 2012, and provides the conservation and habitat management goals and strategies for this species (Fuller et al 2012).

American black duck is a species of concern in the North American Waterfowl Management Plan because of historic population declines, and is listed as highest priority for conservation in BCR 30. Black ducks use wetlands, including shrub swamp communities, as stopover habitat during migration, and as breeding and wintering habitat. Well-concealed nests are placed on the ground in nearby uplands or hummocks in wetlands, and adults and their broods forage on seeds, aquatic vegetation and invertebrates (Longcore et al. 2000, DeGraaf and Yamasaki 2001). Open water habitat, and the adjacent wetland complex provides excellent wintering and migrating habitat for American black ducks. And located on the Connecticut River, an important migration corridor, these wetland communities are used by other waterfowl species during migration including green-winged teal, common merganser, mallards, bufflehead, and wood ducks.

Due to our unfamiliarity with habitat conditions in the CFA, management of this wetland complex will first require a comprehensive, multi-scale wildlife habitat inventory. Wildlife species survival and breeding success is dependent not only on the habitat at a fine scale (shrub swamps), but also the surrounding landscape, making it necessary to look at the adjacent habitat conditions and land uses within the CFA. Baseline information on the condition of these wetlands at the time of acquisition will further inform more detailed habitat prescriptions within a required step-down HMP.

Management Strategies:

Within 5 years of CCP approval:

- Minimize refuge activities that disturb wetland communities.
- If appropriate, incorporate shrub swamps into the network of habitat patches required for New England cottontail.
- Work with partners, including CTDEEP in support of the State Wildlife Action Plan, to ensure management on Service lands complement adjacent land management objectives.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Survey wildlife utilization of wetlands.
- Map natural communities; protect rare or exemplary examples.

Sub-objective 1.1c. (Biological Integrity, Biological Diversity, and Environmental Health)

Where a focal species has not been identified, protect and restore habitats that contribute to the biological integrity, diversity, and environmental health of refuge lands and the Connecticut River watershed.

Rationale:

Achieving the refuge purposes and the Refuge System mission are the paramount considerations for refuge management. Additionally, the Service has policy for maintaining and restoring, where appropriate, refuges' "biological integrity, diversity, and environmental health" (601 FW 3). This policy provides refuge managers with a process to analyze their refuge and recommend the best management direction to prevent further degradation of environmental conditions; and where appropriate, restore lost or severely degraded components. The policy suggests using historic conditions as a reference for comparing the ecosystem's current composition, structure, and functioning to what it was prior to substantial human related changes to the landscape. This comparison can be used to direct management to maintain or restore those natural conditions, to the extent practicable, without jeopardizing refuge purposes. For example, we consider the natural timing and frequency of disturbances, such as fires and flooding, and mimic those processes. In other words, the policy is intended to induce management for native fish, wildlife, and plants and their habitats in natural conditions, and with natural processes, using historic conditions to help identify such conditions and processes (Paveglio et al. 2010). However, we recognize that it is not always possible or desirable to try to mimic historic conditions, particularly in the face of predicted climate and land use changes and other landscape-scale considerations. Historic conditions are only one of many considerations when making decisions about how to manage refuge resources.

Conservationists often use the metaphor of coarse filters and fine filters to convey two complementary strategies for maintaining biological diversity, biological integrity, and environmental health: the first focuses on conserving ecosystems and the second focuses on species (Noss 1987, Hunter 1991, Groves 2003). The coarse-filter approach seeks to protect a representative array of natural ecosystems and their constituent processes, structures, and

species (the refuge); however, some species fall through its pores, and coarse filters must be complemented by fine filter strategies tailored to fit particular species (priority species of concern). Sub-objectives throughout this plan generally represent a fine-filter approach—identifying species and their habitats that the USFWS has identified as priorities based upon our establishing legislation, refuge system mission, regional and national conservation plans, and conversations with conservation partners. In contrast, this sub-objective outlines CFA management that will benefit many of its species, the majority of which will not receive the special, tailored attention of fine-filter conservation. The BIDEH policy guidance complements coarse-filter conservation in ways that fine-filter conservation misses.

The key idea of BIDEH conservation is that most ecosystems contain certain features that are critical to the welfare of many species; thus, conserving those features can have a positive effect on a large suite of species (biological diversity). Logs in a forest, hedgerows in an agricultural landscape, and streams and pools in many terrestrial ecosystems are all examples of ecosystem features that support far more species than one would predict based on their size alone. The importance of conserving these features is widely recognized, but in an ad hoc, idiosyncratic fashion that often does not recognize the commonality between maintaining a hedgerow, a rock outcrop, and an herbaceous wetland. BIDEH conservation overlaps with many aspects of matrix management and ecosystem management (Lindenmayer and Franklin 2002). A key difference is its specific focus on ecosystem elements, which explicitly complements coarse-filter and fine-filter conservation.

Habitats that occur within the Whalebone Cove CFA where species-specific management guidelines are not identified will be managed under the umbrella BIDEH policy. These habitats are most often small or isolated occurrences, but are important in maintaining connectivity within the larger forested matrix, and providing additional structural and species diversity to the matrix. Rocky outcrops and upland meadows, for instance, are anomalies in an otherwise forested landscape. They often have a special flora and fauna—providing sunny, dry sites for reptiles to bask, or nectar producing flowers for foraging butterflies. One could make the case that these outcrops are small, independent ecosystems, but they are really too small to be candidates for a classic coarse-filter strategy and thus best considered in a BIDEH context. This approach will allow the conservation of large numbers of species, the majority of which are too poorly known to be conserved individually (e.g., imagine species conservation plans for particular insects or liverworts). Together, the multiple strategies are reasonably comprehensive because all species and habitats known to be in jeopardy will receive needed attention.

The negative consequences of habitat loss and fragmentation to aspects of biological integrity, diversity and health have been shown by a large number of theoretical and empirical studies, in different environments, and for a large array of taxa (Fahrig 2003). Our understanding of the current condition of all the habitats considered under this sub-objective and their contribution to the BIDEH of the CFA is poor. A comprehensive forest and wildlife habitat inventory will be necessary to inform more detailed management strategies that provide the full range of natural processes.

Management Strategies:

Within 5 years of CCP approval:

- Work with partners, including CTDEEP in support of the State Wildlife Action Plan, to ensure management on Service lands complement adjacent land management objectives.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Conduct habitat and wildlife inventories.
- Map natural communities; protect rare or exemplary examples

Objective 1.2: Non-forested Uplands and Wetlands

Sub-objective 1.2a. (Freshwater Marsh)

Manage freshwater marshes to support natural and rare ecological communities, and provide habitat for priority refuge resources of concern including American black duck, and waders such as snowy egret, and rails.

Rationale:

Freshwater marshes are often dominated by emergent and submergent herbaceous vegetation. Scattered shrubs are often present, and trees are generally absent. Herbaceous vegetation typically includes common bulrush,

jewelweed, marsh fern, water lily, and narrow-leaved cattail (Gawler 2008). Our coarse-scale habitat analysis of this CFA identifies a wetland complex, consisting of shrub swamp and freshwater marsh communities, at the mouth of Joshua and Whalebone Creeks, and on the perimeter of Selden Creek and Chapman Pond. These tide influenced wetlands provide a diversity of plant communities, and habitats for a variety of wildlife species, including American black duck, long-legged waders such as snowy egret and rails. Please see sub-objective 1.2a for a detailed discussion on shrub swamp communities, and priority resources of concern.

American black duck is a species of concern in the North American Waterfowl Management Plan because of historic population declines, and is listed as highest priority for conservation in BCR 30. Black ducks use wetlands, including freshwater marsh communities, as stopover habitat during migration, and as breeding and wintering habitat. Well-concealed nests are placed on the ground in nearby uplands or hummocks in wetlands, and adults and their broods forage on seeds, aquatic vegetation and invertebrates (Longcore et al. 2000, DeGraaf and Yamasaki 2001). Open water habitat, and this adjacent wetland complex provides excellent wintering and migrating habitat for American black ducks. And located on the Connecticut River, an important migration corridor; these wetland communities are used by other waterfowl species during migration including green-winged teal, common merganser, mallards, bufflehead and wood ducks.

These freshwater marsh habitats also provide important habitat for waders, such as snowy egrets and lesser yellow legs, and rails including Virginia rail. Snowy egrets are one of thirteen target species to benefit from conservation actions within large freshwater wetland habitats in BCR 30 (Steinkamp, Melanie 2008). This species is also a state species of conservation concern. Egrets use the CFA freshwater wetlands as foraging areas, and may be important for post-nesting dispersals (P. Comins personal communication 2010).

Due to our unfamiliarity with habitat conditions in the CFA, management of this wetland complex will first require a comprehensive, multi-scale wildlife habitat inventory. Wildlife species survival and breeding success is dependent not only on the habitat at a fine scale (freshwater marsh), but also the surrounding landscape, making it necessary to look at the adjacent habitat conditions and land uses within the CFA. Baseline information on the condition of these wetlands at the time of acquisition will further inform more detailed habitat prescriptions within a required step-down HMP.

Management Strategies:

Within 5 years of CCP approval:

- Evaluate wetland hydrology for impacts to natural flow regimes.
- Work with partners, including CTDEEP in support of the State Wildlife Action Plan, to ensure management on Service lands complement adjacent land management objectives.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Inventory wetland plant communities.
- Survey wildlife use of existing wetlands.
- Map natural communities; protect rare or exemplary examples.

Sub-objective 1.2b. (Pasture/Hay/Grassland and Old Fields and Shrublands)

Provide appropriate conditions within current pasture, hay, and grassland acreage, and old field and shrubland habitat that will support New England cottontail (where appropriate), and other shrub-dependent conservation concern species such as blue-winged warbler.

Rationale:

Over two percent of the Whalebone Cove CFA is typed as pasture, hay, grassland, old fields and shrublands. These habitat types require active manipulation to inhibit the natural succession of converting to forest. The pasture, hay, and grassland habitats tend to be dominated by grasses, while shrubs dominate shrublands, and a mixture of shrubs and grasses tend to occur in old fields.

Many bird species of conservation concern rely on these habitats, including grassland dependent species such as bobolink and grasshopper sparrow, and shrub dependent species such as blue-winged warbler, prairie warbler, field sparrow, American woodcock, and chestnut-sided warbler. Many shrubland bird breeding populations occur in high proportions in the northeast, and therefore, are species of conservation responsibility (Dettmers, Randy 2003). While there is evidence that southern New England supported a small but significant grassland bird community before European settlement, only a small proportion of grassland breeding bird populations occur in the northeast (Dettmers and Rosenberg 2000). Maintaining high quality shrubland habitat in this CFA will provide habitat for a higher percentage of species in decline. However, large and contiguous grasslands are rare in the watershed, and large grassland habitat patches are important to high priority grassland species and overall biological diversity. We will maintain large grassland patches (e.g. 500 acres), or areas where a high proportion of grassland cover is present in the landscape (e.g., a mosaic of many medium to large patches).

Another species of conservation concern that uses shrubland dominated habitat is New England cottontail. This species is petitioned for listing under the ESA, and is a species of greatest conservation need in Connecticut. The Whalebone Cove CFA is a New England cottontail Focus Area, which are areas identified as locations to manage and restore habitat for New England cottontail. New England cottontail require early successional habitat (dense shrubs and tree saplings). The pastures, hay fields, and grasslands within the CFA, if allowed to revert to woody stems, will provide this habitat with very little initial manipulation.

The conceptual model for the conservation of New England cottontail is for a focus area to contain at least 1,000 acres of early successional habitat of fifteen or more habitat patches, several of which are 25 acres or more. Each habitat patch should be one mile or less from each other to aid in New England cottontail movement between patches (Fuller and Tur 2012). Where appropriate, pastures, hay fields, grasslands, shrublands, and old fields will be incorporated into the network of patches managed for New England cottontail by allowing woody stem colonization.

Shrubland dominated habitats in the northeast support many species of conservation concern, many of which are a high conservation responsibility for the region, indicating the importance of shrubland habitats to these species in the CFA. Large, contiguous grassland habitats are also important to a suite of priority grassland bird species. Current pasture, hay, grassland, old fields and shrubland acres can provide quality habitat if managed appropriately. Baseline information on the condition of these habitats and association with other landscape features will further inform more detailed habitat prescriptions within a required step-down HMP.

Management Strategies:

Within 5 years of land acquisition and CCP approval:

- Work with partners to protect and promote farming practices (e.g. haying and pasture of animals) that benefit wildlife and protect water quality.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Conduct an inventory of these habitats to determine their condition, size and location, which will inform and prioritize appropriate management strategies in the HMP.

Objective 1.3: Inland Aquatic Habitats

Sub-objective 1.3a. (Open Water)

In collaboration with partners, identify and implement habitat restoration opportunities within the Whalebone Cove CFA to benefit priority refuge resources of concern including American eel, alewife, blueback herring, Atlantic sturgeon and brook trout, as well as other species of conservation concern such as sea lamprey. Also provide undisturbed wintering and stopover habitat for American black duck, and other waterfowl.

Rationale:

Whalebone Cove CFA aquatic habitats are among the highest in quality of the shallow fresh water bays, coves, tidal creeks, and tributaries which typify the Lower Connecticut River and the significant overwintering, spawning and feeding habitat they provide for a large number of fish species. Many species of conservation concern use these aquatic habitats including American eel, alewife, Atlantic sturgeon, blueback herring, brook trout and sea lamprey.

Many of the tidally influenced coves and creeks, including Whalebone cove, and Whalebone and Joshua creeks, provide important spawning habitat for alewife and blueback herring. The creeks also provide excellent nursery habitat for these species. American eel, a species petitioned for federal listing, spend the majority of their young life in the freshwater systems of this CFA. American eel enter the Connecticut River as juveniles, and migrate upstream to inhabit bays, estuaries, streams, lakes, and ponds. Eels feed in these aquatic habitats until they reach sexual maturity and begin the long migration to their spawning grounds in the Sargasso Sea (ASMFC 2000).

Juvenile Atlantic sturgeon were recently documented in the lower portion of the Connecticut River (S. Gephard, CTDEEP, personal communication 2015). This Federal endangered species and a species of greatest conservation need in Connecticut, were once considered extirpated in the Connecticut River, as reproduction no longer occurred in the main stem (Sprankle personal communication 2014). The documentation of juveniles provides a higher probability and opportunities for recovery of this species in the Connecticut River.

Brook trout occur in the upland portions of the CFA, where free-flowing cold water habitat is present, and a requirement for this species life cycle. Brook Trout are a species of conservation concern due to habitat loss and potential impacts from climate change. This species is present in the tributaries to Eightmile, and Chapman Pond.

Another species of conservation concern that utilize freshwater aquatic habitats in this CFA is sea lamprey. Sea lamprey enter the Connecticut River and tributaries to reproduce, and in the process provide important ecological benefits to aquatic systems. Adults transport nutrients between freshwater and saltwater systems, their nest construction restores and enhances streambed structure, abandoned nests are used by other riverine fish, and lamprey eggs and larvae provide food for a variety of species (Kircheis 2004). As with many riverine fish, sea lamprey movement is impeded by barriers on the main stem and tributaries.

The open water habitat within the various coves, rivers, creeks and wetlands provide excellent wintering and stopover habitat for American black duck. Other migratory waterfowl also take advantage of these secluded areas including green-winged teal, common merganser, mallards, bufflehead and wood ducks. This open water habitat also supports foraging opportunities for bald eagles and osprey.

The aquatic habitats in the Whalebone Cove CFA are diverse, and provide habitat for a variety of wildlife species. Development and human activities have impacted water quality and infringed on aquatic species movements and life cycles. We will work with partners to analyze current available data, and conduct additional assessments, as needed, to inform more detailed management and monitoring strategies within a required step-down HMP.

Management Strategies:

Within 10 years of approval:

- Work with partners to protect and increase “hard bottom” (e.g., gravel, cobble, or bedrock) for spawning aquatic species.
- Work with partners to reduce combined sewer overflow.

Inventory and Monitoring Strategies:

Within 5 years of approval:

- Work with partners to conduct stream assessments to evaluate stream and fish community health.
- Work with partners to conduct a physical and biological assessment of Whalebone Cove.

Objective 1.4: Coastal Non-forested Uplands (coastal beaches and rocky shores)

Sub-objective 1.4a. (Biological Integrity, Biological Diversity, and Environmental Health)

Where a focal species has not been identified, protect and restore habitats that contribute to the biological integrity, diversity, and environmental health of refuge lands and the Connecticut River watershed.

Rationale:

Achieving the refuge purposes and the Refuge System mission are the paramount considerations for refuge management. Additionally, the Service has policy for maintaining and restoring, where appropriate, refuges'

“biological integrity, diversity, and environmental health” (601 FW 3). This policy provides refuge managers with a process to analyze their refuge and recommend the best management direction to prevent further degradation of environmental conditions; and where appropriate, restore lost or severely degraded components. The policy suggests using historic conditions as a reference for comparing the ecosystem’s current composition, structure, and functioning to what it was prior to substantial human related changes to the landscape. This comparison can be used to direct management to maintain or restore those natural conditions, to the extent practicable, without jeopardizing refuge purposes. For example, we consider the natural timing and frequency of disturbances, such as fires and flooding, and mimic those processes. In other words, the policy is intended to induce management for native fish, wildlife, and plants and their habitats in natural conditions, and with natural processes, using historic conditions to help identify such conditions and processes (Paveglio et al. 2010). However, we recognize that it is not always possible or desirable to try to mimic historic conditions, particularly in the face of predicted climate and land use changes and other landscape-scale considerations. Historic conditions are only one of many considerations when making decisions about how to manage refuge resources.

Conservationists often use the metaphor of coarse filters and fine filters to convey two complementary strategies for maintaining biological diversity, biological integrity, and environmental health: the first focuses on conserving ecosystems and the second focuses on species (Noss 1987, Hunter 1991, Groves 2003). The coarse-filter approach seeks to protect a representative array of natural ecosystems and their constituent processes, structures, and species (the refuge); however, some species fall through its pores, and coarse filters must be complemented by fine filter strategies tailored to fit particular species (priority species of concern). Sub-objectives throughout this plan generally represent a fine-filter approach—identifying species and their habitats that the USFWS has identified as priorities based upon our establishing legislation, refuge system mission, regional and national conservation plans, and conversations with conservation partners. In contrast, this sub-objective outlines CFA management that will benefit many of its species, the majority of which will not receive the special, tailored attention of fine-filter conservation. The BIDEH policy guidance complements coarse-filter conservation in ways that fine-filter conservation misses.

The key idea of BIDEH conservation is that most ecosystems contain certain features that are critical to the welfare of many species; thus, conserving those features can have a positive effect on a large suite of species (biological diversity). Logs in a forest, hedgerows in an agricultural landscape, and slow moving streams and pools in wetland ecosystems are all examples of ecosystem features that support far more species than one would predict based on their size alone. The importance of conserving these features is widely recognized, but in an ad hoc, idiosyncratic fashion that often does not recognize the commonality between maintaining a hedgerow, a rock outcrop, and an herbaceous wetland. BIDEH conservation overlaps with many aspects of matrix management and ecosystem management (Lindenmayer and Franklin 2002). A key difference is its specific focus on ecosystem elements, which explicitly complements coarse-filter and fine-filter conservation.

Habitats that occur within the Whalebone Cove CFA where species-specific management guidelines are not identified will be managed under the umbrella BIDEH policy. These habitats are most often small or isolated occurrences, but are important in maintaining connectivity within the larger upland and wetland matrix, and providing additional structural and species diversity to the matrix. Rocky shorelines along large river systems and wet meadows, for instance, are anomalies in an otherwise forested landscape. They often have a special flora and fauna—providing sunny, dry sites for reptiles to bask, or nectar producing flowers for foraging butterflies. One could make the case that these meadows are small, independent ecosystems, but they are really too small to be candidates for a classic coarse-filter strategy and thus best considered in a BIDEH context. This approach will allow the conservation of large numbers of species, the majority of which are too poorly known to be conserved individually (e.g., imagine species conservation plans for particular insects or liverworts). Together, the multiple strategies are reasonably comprehensive because all species and habitats known to be in jeopardy will receive needed attention.

The negative consequences of habitat loss and fragmentation to aspects of biological integrity, diversity and health have been shown by a large number of theoretical and empirical studies, in different environments, and for a large array of taxa (Fahrig 2003). Our understanding of the current condition of all the habitats considered under this sub-objective and their contribution to the BIDEH of the CFA is poor. A comprehensive forest and wildlife habitat inventory will be necessary to inform more detailed management strategies that provide the full range of natural processes.

Management Strategies:

Within 5 years of CCP approval:

- Work with partners, including CTDEEP in support of the State Wildlife Action Plan, to ensure management on Service lands complement adjacent land management objectives.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Conduct habitat and wildlife inventories.
- Map natural communities; protect rare or exemplary examples.

Objective 1.5: Coastal Wetlands and Aquatic Habitats (tidal salt marsh and estuary)

Sub-objective 1.5a. (Biological Integrity, Biological Diversity, and Environmental Health)

Where a focal species has not been identified, protect and restore habitats that contribute to the biological integrity, diversity, and environmental health of refuge lands and the Connecticut River watershed.

Rationale:

See the rationale for objective 1.4a.

Habitats that occur within the Whalebone Cove CFA where species-specific management guidelines are not identified will be managed under the umbrella BIDEH policy. These habitats are most often small or isolated occurrences, but are important in maintaining connectivity within the larger forested matrix, and providing additional structural and species diversity to the matrix. Rocky shorelines along large river systems and wet meadows, for instance, are anomalies in an otherwise forested landscape. They often have a special flora and fauna—providing sunny, dry sites for reptiles to bask, or nectar producing flowers for foraging butterflies. One could make the case that these meadows are small, independent ecosystems, but they are really too small to be candidates for a classic coarse-filter strategy and thus best considered in a BIDEH context. This approach will allow the conservation of large numbers of species, the majority of which are too poorly known to be conserved individually (e.g., imagine species conservation plans for particular insects or liverworts). Together, the multiple strategies are reasonably comprehensive because all species and habitats known to be in jeopardy will receive needed attention.

The negative consequences of habitat loss and fragmentation to aspects of biological integrity, diversity and health have been shown by a large number of theoretical and empirical studies, in different environments, and for a large array of taxa (Fahrig 2003). Our understanding of the current condition of all the habitats considered under this sub-objective and their contribution to the BIDEH of the CFA is poor. A comprehensive forest and wildlife habitat inventory will be necessary to inform more detailed management strategies that provide the full range of natural processes.

Management Strategies:

Within 5 years of CCP approval:

- Work with partners, including the State of Connecticut, in support of the State Wildlife Action Plan, to ensure management on Service lands complement adjacent land management objectives.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Conduct habitat and wildlife inventories.
- Map natural communities; protect rare or exemplary examples.

Goal 2: Education, Interpretation, and Outreach: Inspire residents and visitors to actively participate in the conservation and stewardship of the exceptional natural and cultural resources in the Connecticut River watershed, and promote a greater understanding and appreciation of the role of the Silvio O. Conte National Fish and Wildlife Refuge in conserving those resources.

Objective 2.1: Environmental Education

In collaboration with public and private educators from all four states in the watershed, lead or facilitate the implementation of structured natural and cultural resource curricula, with a focus on guiding educators and students to develop an awareness of, and concern about, natural and cultural resources and associated challenges; appreciate our conservation history; make informed decisions and work individually or collectively toward solutions; and model responsible environmental stewardship in their everyday lives.

Sub-objective 2.1a. (Environmental Education Planning and Training)

Encourage schools, scout groups, and summer camps to develop curricula that use the Whalebone Cove Division as an outdoor classroom.

Rationale:

See environmental education rationale in chapter 4 detailing the importance of environmental education for the Service. Environmental education is one of the six priority, wildlife-dependent recreational uses of the Refuge System. Environmental education is particularly important at Conte Refuge because one of its founding purposes is to provide opportunities for environmental education. Environmental education is an important tool that can help refuge visitors and local residents, particularly students, appreciate the importance of this area to the larger watershed.

Management Strategies:

Within 1 year of acquiring sufficient land:

- Encourage schools, scout groups, and summer camps to develop curricula that use the Whalebone Cove Division as an outdoor classroom.

Sub-objective 2.1b. (Environmental Education Delivery)

Encourage schools, scout groups, and summer camps to use the Whalebone Cove Division as an outdoor classroom.

Rationale:

Because this division will be unstaffed, the majority of environmental education opportunities on this division will be led by partners, volunteers, and local school groups and other educational groups (e.g., scout groups and summer camps).

Management Strategies:

Within 1 year of acquiring sufficient land:

- Encourage schools, scout groups, and summer camps to develop curricula that use the Whalebone Cove Division as an outdoor classroom.

Objective 2.2: Interpretation

Develop, lead, and facilitate interpretive programs that emotionally and intellectually connect the audience to natural and cultural resources in the watershed.

Sub-objective 2.2a. (Natural and Cultural Resource Interpretive Planning and Training)

With Friends groups, public and non-profit organizations, and volunteers, offer quality interpretive programming at the Whalebone Cove Division. The development of highly trained interpreters will be encouraged by offering interpretive training to Friends' members, partners, and volunteers on a regular basis.

Rationale:

See the rationale in chapter 4 detailing the importance of interpretation for the Service. Interpretation is an important tool that can help refuge visitors and local residents appreciate the importance of this area to the larger watershed. With an ADA-compliant trail planned for the site, the Whalebone Cove Division will be well suited to support both self-guided, wildlife dependent interpretive experiences, as well as guided interpretive programs that convey messages about the refuge and about the Whalebone Cove Division's habitats and cultural resources.

Management Strategies:

(These strategies are dependent on land acquisition from willing landowners.)

Within 5 years of acquiring sufficient land:

- Inventory and evaluate each CFA to determine the appropriate interpretive materials to employ.
- Create meaningful, consistent, thematic statements to be used in the delivery of programming at the Whalebone Cove Division.
- Provide resources and trainings to Friends, and volunteers in support of interpretive programs.

Within 10 years of acquiring sufficient land:

- Develop standardized self-guided interpretive services, such as interpretive trails and kiosks, exhibits, and printed media.
- Employ a variety of themed interpretive offerings (e.g., presentations, audio-visual programs, brochures, and exhibits) when creating programming for natural and cultural resource interpretation.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Build an evaluation process that includes formal and informal evaluation to assess the effectiveness of all interpretation programs.

Sub-objective 2.2b. (Natural and Cultural Resource Interpretive Program Delivery)

Collaborate with Friends group, partners, and volunteers to deliver quality natural and cultural resource interpretive programs.

Rationale:

See rationale for sub-objective 2.2a.

Management Strategies:

(These strategies are dependent on land acquisition from willing landowners.)

Within 5 years of acquiring sufficient land:

- Through partners, and Friends group, annually provide quality interpretive programs, exhibits, printed media at the Whalebone Cove Division.
- Incorporate thematic statements, measureable objectives and evaluation measures into all interpretation efforts.
- Publicize interpretive programs through traditional media, on the refuge web site, and digital social media conduits.
- Maintain a supply of print interpretive brochures, i.e., general brochure and bird checklist that incorporate refuge interpretive messages and themes.
- Work with partners to create issue-oriented experiential activities and programs for use at their facilities.

Within 10 years of acquiring sufficient land:

- Contribute refuge interpretive information for scenic byways and other state publications and signs.
- Develop self-guided interpretive messages and use state of the art as well as traditional media (e.g., brochures).

Objective 2.3: Public and Community Outreach

Support, promote, and coordinate a wide range of outreach tools and activities to facilitate and improve communications and relationships with the American public, especially communities, adjacent landowners, and elected officials in the Connecticut River watershed, and to empower citizens to recognize and resolve local natural resource issues and promote conservation and the responsible use of natural resources.

Because the Whalebone Cove Division would be unstaffed and does not have refuge facilities, public and community outreach for this site will occur through regular outreach activities at the headquarters and will not specifically occur at this site.

Objective 2.4: Science and Technical Outreach

Facilitate the collection and exchange of information that increases the knowledge and understanding of natural and cultural resources, addresses climate change and other conservation issues, and provides land managers with better information to make management decisions affecting resources.

Because the Whalebone Cove Division is unstaffed and does not have refuge facilities, science and technical outreach for this site will occur through regular outreach activities at the headquarters and will not specifically occur at this site.

Goal 3: Recreation: Promote high-quality, public recreational opportunities in the Connecticut River watershed that are complementary between ownerships and provide regional linkages with emphasis on promoting wildlife-dependent activities that connect people with nature.

Objective 3.1: Hunting

Support quality public hunting opportunities in the Connecticut River watershed to promote a unique understanding and appreciation of natural resources and their management on lands and waters, while also protecting a traditional outdoor pastime deeply rooted in America's natural heritage and conservation history.

Sub-objective 3.1a. (Hunting Opportunity, Access and Infrastructure)

Provide the opportunity for a quality hunting experience based on state regulations.

Rationale:

The Whalebone Cove Division is comprised of floodplain forests and wetlands adjacent to the Connecticut River, offering good hunting opportunities for waterfowl, small game, and white-tailed deer. Public hunting areas in the vicinity include Selden Neck State Park. Hunting, consistent with the final compatibility determination, will be allowed when the Service acquires land that can support hunt seasons. Retaining hunting opportunities on public lands will ensure this wildlife-dependent recreational activity continues and contribute to the state's population management objectives.

Management Strategies:

(These strategies are dependent on land acquisition from willing landowners.)

Within 1 year of acquiring sufficient land to support hunting seasons:

- Complete all administrative requirements to officially open to hunting consistent with State hunting regulations and, if necessary, additional refuge-specific regulations.
- Allow hunters access to the refuge outside of the normal division open hours (i.e. 30 minutes before sunrise and 30 minutes after sunset) as long as they are engaged in lawful hunting activities.

- Consult with Connecticut Department of Energy and Environmental Protection, Hunting Review Team in evaluating the suitability of new acquisitions to support a safe, manageable hunt program.
- Post newly acquired properties to ensure refuge boundary lines are clearly marked.
- Install an informational kiosk in a conspicuous location to post information on hunting seasons and other notices to visitors.

Within 5 years of acquiring land sufficient land to support hunting seasons:

- Work with Connecticut Department of Energy and Environmental Protection to determine whether opportunities exist for state-recognized disabled hunters.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Work with Connecticut Department of Energy and Environmental Protection to evaluate the effectiveness and success of the refuge hunt program in contributing to state population objectives.

Sub-objective 3.1b. (Hunter Education and Outreach)

Provide hunter education classes access to the division and conduct directed outreach to ensure hunters are informed about regulations, hunter ethics, and safety considerations. Develop programs, including brochures, signage, website pages, media releases, etc. to increase interest in hunting at the division.

Rationale:

Hunting is a priority public use that also serves as a population management tool. Providing hunter education instructors the opportunity to use the division with their classes will strengthen connections to the hunting community and student understanding of the role hunting plays in wildlife management. Making relevant information readily available to hunters through a variety of media will improve the quality of the hunting experience.

Management Strategies:

(These strategies are dependent on land acquisition from willing landowners.)

Within 1 year of acquiring land sufficient land to support hunting seasons:

- Produce a hunt brochure that includes a hunt map and information on regulations, hunter ethics, safety considerations, etc. and make it available on the refuge Web site, at Whalebone Cove Division kiosks, through a friends group, and in local businesses.
- Provide visitors with general information on the hunting program and refuge-specific and State regulations through the refuge website, information signs, and a hunting brochure. In all materials related to the hunting program, promote and encourage the use of lead-free ammunition.
- Work with the State to identify and evaluate the impacts associated with requiring the use of non-toxic ammunition for hunting on refuge lands.

Within 5 years of acquiring land sufficient land to support hunting seasons:

- Work with Connecticut Department of Energy and Environmental Protection to encourage youth hunting at the division as a means of introducing young people to this traditional recreation activity.
- Offer to host hunter education field courses.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Develop a system to monitor and evaluate the hunting program with hunters and other users to determine if the objective is being met and to allow for adaptive management.

Objective 3.2: Fishing

Support quality, public fishing opportunities in the Connecticut River watershed to promote an understanding and appreciation of natural resources and their management on lands and waters, while also protecting a traditional outdoor pastime deeply rooted in the America's natural heritage and conservation history.

Sub-objective 3.2a. (Fishing Opportunities, Access and Infrastructure)

Provide quality fishing opportunities at the Whalebone Cove Division after completing all administrative procedures to officially open refuge lands to fishing, consistent with the final compatibility determination, based on Connecticut Department of Energy and Environmental Protection regulations, and any division-specific conditions.

Rationale:

Fishing would be allowed on a newly created division, consistent with the final compatibility determination. The principal fishing resources on this CFA are the Connecticut River and the Eightmile River; although there are several other smaller streams that support game fish. However, some of these streams are difficult to access. Most people fish the Connecticut River from boats, but allowing bank fishing on the Whalebone Cove Division, where it can be done safely and not significantly impact resources, would provide the public with another recreational opportunity. Fishing is a popular activity in this area and would continue under Service ownership. Retaining fishing opportunities conforms to historic use on CFA and much of the surrounding land in the area.

Management Strategies:

(These strategies are dependent on land acquisition from willing landowners.)

Within 1 year of acquiring land with fishable waters:

- Complete all administrative requirements to officially open to fishing consistent with State hunting regulations and, if necessary, additional refuge-specific regulations.
- Post newly acquired properties to ensure refuge boundary lines are clearly marked.
- Install an informational kiosk in a conspicuous location to post information on fishing seasons and other notices to visitors.
- The Whalebone Cove Division would be open to visitors actively engaged in fishing during the seasons and times established by the state in their annual fishing regulations.

Within 5 years of acquiring land with fishable waters:

- Work with the Connecticut Department of Energy and Environmental Protection to inventory and assess fish populations on the division.

Inventory and Monitoring Strategies:

Within 5 years of land acquisition and CCP approval:

- Develop a system to monitor and evaluate the fishing program with anglers and other users to determine the objective is being met and to allow for adaptive management.

Sub-objective 3.2b. (Angler Education and Outreach)

Develop programs, including brochures, signage, Web site pages, media releases, etc. to inform visitors of fishing opportunities at the division.

Rationale:

Fishing is a priority public use and a traditional use in the CFA. If land is acquired, the refuge will make information readily available to interested anglers regarding opportunities to fish on Service-owned land, location of fishable waters, and the available game fish.

Management Strategies:

(These strategies are dependent on land acquisition from willing landowners.)

Within 1 year of acquiring land with fishable waters:

- Produce a fishing brochure that includes information on regulations, angler ethics, safety considerations, etc. and make it available on the refuge website, at informational kiosks, and in local businesses. In all materials related to the fishing program, promote use of lead-free tackle.

Objective 3.3: Wildlife Observation and Photography

Support quality, public opportunities to observe and photograph wildlife in the Connecticut River watershed in a variety of natural habitats to connect a broad spectrum of people with nature.

Sub-objective 3.3a. (Infrastructure and Access for Wildlife Observation and Photography)

Provide quality opportunities for wildlife observation and photography for people of all physical abilities, if these activities are found to be compatible uses.

Rationale:

Wildlife viewing and photography is a priority public use on national wildlife refuges and a popular recreational activity. Opening acquired land in this new division to wildlife observation and photography will provide visitors a chance to see and photograph a variety of wildlife species in their native habitats, while learning more about the Service, Refuge System, and the refuge.

Management Strategies:

(These strategies are dependent on land acquisition from willing landowners.)

Within 1 year of CCP approval:

- Allow public access from 30 minutes before sunrise to 30 minutes after sunset with the exception listed for hunters and anglers.
- Install an informational kiosk in a conspicuous location to post information on wildlife observation and photography opportunities, and other notices to visitors.

Within 5 years of CCP approval:

- Develop a public access strategy and required planning (i.e. NEPA, compatibility determination) that includes consideration of developed trails, parking, kiosks, viewing platforms, blinds, interpretation, signage, etc.

Within 15 years of CCP approval:

- Implement the visitor use enhancements identified in the public access strategy and the refuge Visitor Services Plan.

Sub-objective 3.3b. (Wildlife Observation and Photography Aids)

Offer viewing and photography aids that enhance the visitor experience. Use a variety of methods to reach a broad spectrum of people. Work closely with a friends group and other partners that host events designed to view wildlife on the division.

Rationale:

The entire division would be available for wildlife observation and photography; however, there are steps the refuge can take to enhance the experience. By providing new visitors a quality experience they are more likely to return and share their experiences with others. One way to accomplish this is to offer sufficient information to attract a variety of visitors through a variety of media.

Management Strategies:

(These strategies are dependent on land acquisition from willing landowners.)

Within 1 year of CCP approval:

- Allow photography blinds that do not negatively impact wildlife behavior or conflict with other visitors. Blinds must be removed each day, unless arrangements have been made via a special use permit.

Within 5 years of CCP approval:

- Develop interpretive panels describing typical wildlife on the refuge, bird migration patterns, and other messages we want to convey to visitors.
- Sponsor wildlife observation events such as International Migratory Bird Day, the Big Sit, etc.
- Encourage local schools and environmental organizations to offer wildlife-centered trips to the refuge.
- Produce a list of wildlife species and associated habitats and other conservation information on the division for distribution at informational kiosks, the refuge website, and other popular media.

Within 10 years of CCP approval:

- Develop a public access strategy and required NEPA documentation that includes consideration of developed trails, parking, kiosks, viewing platforms, blinds, interpretation, signage, etc.

Within 15 years of CCP approval:

- Implement the visitor use enhancements identified in the public access strategy and the refuge visitor services plan.

Sub-objective 3.3c. (Watershed-based Partner Initiatives)

Not applicable

Objective 3.4: Other Recreational Activities

In order to reach a broader demographic, support non-priority outdoor recreational opportunities and public access to quality, nature-based experiences throughout the Connecticut River watershed that facilitate and improve community relationships, raise awareness and an appreciation for conserving natural resources, and garner support for the National Wildlife Refuge System.

Sub-objective 3.4a. (Regional Water-based Trail Initiatives and Opportunities Including Refuge Lands)

Develop compatible opportunities on the Whalebone Cove Division that support regional water-based trail initiatives to connect people with nature, raise the visibility of the Service and the Refuge System, make the refuge more relevant to the local community, and to promote economic activity in the local area.

Rationale:

Regional water-based trails give individuals opportunities to engage in outdoor recreational opportunities in the Connecticut River watershed, such as fishing, boating, and wildlife observation. Examples include the Connecticut River waterway route. Where appropriate, we will work with these partners to promote, and distribute information about, these opportunities.

Management Strategies:

Within 5 years of CCP approval:

- Work with public and private partners to determine whether and what roles this division might contribute to a Connecticut River waterway route.
- As lands are acquired, evaluate any water trails (e.g., canoe/kayak trails) that are part of a regional or State network for their compatibility.

Sub-objective 3.4b. (Regional Land-based Trail Initiatives and Opportunities Including Refuge Lands)

Develop compatible opportunities on the Whalebone Cove Division that support regional land-based trail initiatives to connect people with nature, raise the visibility of the Service and the Refuge System, make the refuge more relevant to the local community, and to promote economic activity in the local area.

Rationale:

Regional land-based trails give individuals opportunities to engage in outdoor recreational opportunities in the Connecticut River watershed, such as hiking, wildlife observation, and interpretation. Where appropriate, we will work with these partners to promote, and distribute information about, these opportunities.

Management Strategies:

Within 5 years of acquiring land:

- As lands are acquired, evaluate any existing trails (e.g., hiking trails, snowmobile trails, horseback riding trails) that are part of an established regional or State network to determine if they are appropriate and compatible uses for the refuge.

Sub-objective 3.4c. (Other Appropriate and Compatible Recreational Opportunities That Enhance Visitor Use and Enjoyment of Refuge Lands)

Allow compatible outdoor recreational opportunities on the Whalebone Cove Division that connect people with nature, raise the visibility of the Service and the Refuge System, make the refuge more relevant to the local community, and promote economic activity in the local area.

Rationale:

In addition to the priority public uses, there are other wildlife-dependent, appropriate and compatible recreational activities that can broaden the visitor base, giving people alternative ways to enjoy the natural resources at the division without detrimentally impacting the wildlife resource.

Management Strategies:

(These strategies are dependent on the determination that the use is both appropriate and compatible.)

Within 1 year of CCP approval:

- Allow dispersed hiking, snowshoeing, and cross country skiing.
- Allow pet walking. In order to minimize conflicts with wildlife and other visitors, pets must be on leashes not longer than 10 feet in length.
- Allow recreational gathering of blueberries, blackberries, strawberries, raspberries, mushrooms, fiddleheads, and antler sheds.
- When compatible, allow commercial guiding in support of priority public uses by special use permit.
- Allow canoeing and kayaking in acquired coves and waterways.

Within 5 years of CCP approval:

- Work with Friends groups and partners to design and market a virtual geocache course at the division. The course should integrate orienteering with refuge interpretive messages that include linking this division to other refuge divisions and units.

Overview Dead Man's Swamp Unit (Existing Refuge Unit) Cromwell, Connecticut

Total Unit Acres ¹	31
-------------------------------	----

¹Actual acres

What are the priority habitat types within the unit?

- Hardwood forest - 25%
- Hardwood Swamp – 49%
- Freshwater Marsh – 7%
- Open water – 17%

For more information on the unit's habitats, see map A.18 and table A.16.

What are the Federal trust and other natural resource values in the unit?

1. Endangered Species

The Puritan tiger beetle, a federally listed species, uses beach habitat on the south end of the Dead Man's Swamp Unit along the Connecticut River. Beetles also utilize beach habitat adjacent to the northern portion of the unit, which is privately owned. The river flow dynamics of the Connecticut River creates open sandy beaches that are required for breeding beetles. Encroachment of herbaceous and woody plants reduces suitable larval habitat and because of this there has been periodic vegetation control on this unit.

Both populations are monitored by the State. A site visit with partners in 2011, determined that vegetation and silt are impacting tiger beetle populations on the southern portion of the Unit, and very few adults have been observed. Removal of this vegetation will be necessary to provide appropriate tiger beetle habitat. The beach habitat adjacent to the north end of the unit is expanding, and beetle numbers are increasing, though recreational activities may impact recovery.

Recovery criteria in the USFWS Puritan Beetle Recovery Plan specifies a minimum of three meta-populations, at least two of which are large (500 to 1000 or more adults) are maintained or established (i.e., self-maintained for at least 10 years) within the species historical range along the Connecticut River, and habitat they occupy is permanently protected (Hill and Knisley 1993). We will continue to work with partners in the recovery of Puritan tiger beetle populations in the Connecticut River.

2. Migratory Birds

The Connecticut River watershed is a major migration corridor for bird species. The lower portion of the watershed (CT and MA) receives higher use by migrants, with use concentrated in habitats along the Connecticut River main stem (Smith College 2006). Dead Man's Swamp Unit abuts the Connecticut River, and though small in acreage, the forest and wetlands are important stopover habitat for landbirds.

3. Waterfowl

The coves adjacent to the Dead Man's Swamp may provide important stopover areas for migrating and wintering waterfowl.

4. Diadromous fish and other aquatic species

The Dead Man's Swamp Unit is adjacent to the Connecticut River which provides important habitat for American shad, shortnose sturgeon, American eel, alewife, blueback herring, and Atlantic salmon.

5. Wetlands

There are 15 acres of hardwood swamp and 2 acres of freshwater marsh on the unit. These wetland acres are adjacent to the Connecticut River, and are part of its floodplain.

What habitat management activities would likely be a priority on refuge lands within the unit?

We will conduct a comprehensive, multi-scale wildlife habitat inventory. Baseline information on the condition of habitats will further inform more detailed, habitat prescriptions within a required step-down Habitat Management Plan (HMP). Once inventory has been completed, then management will focus on the following:

- Work with partners to maintain beach habitats, and monitor Puritan tiger beetle populations.
- Manage invasive plants in the floodplain forest to maintain native diversity.

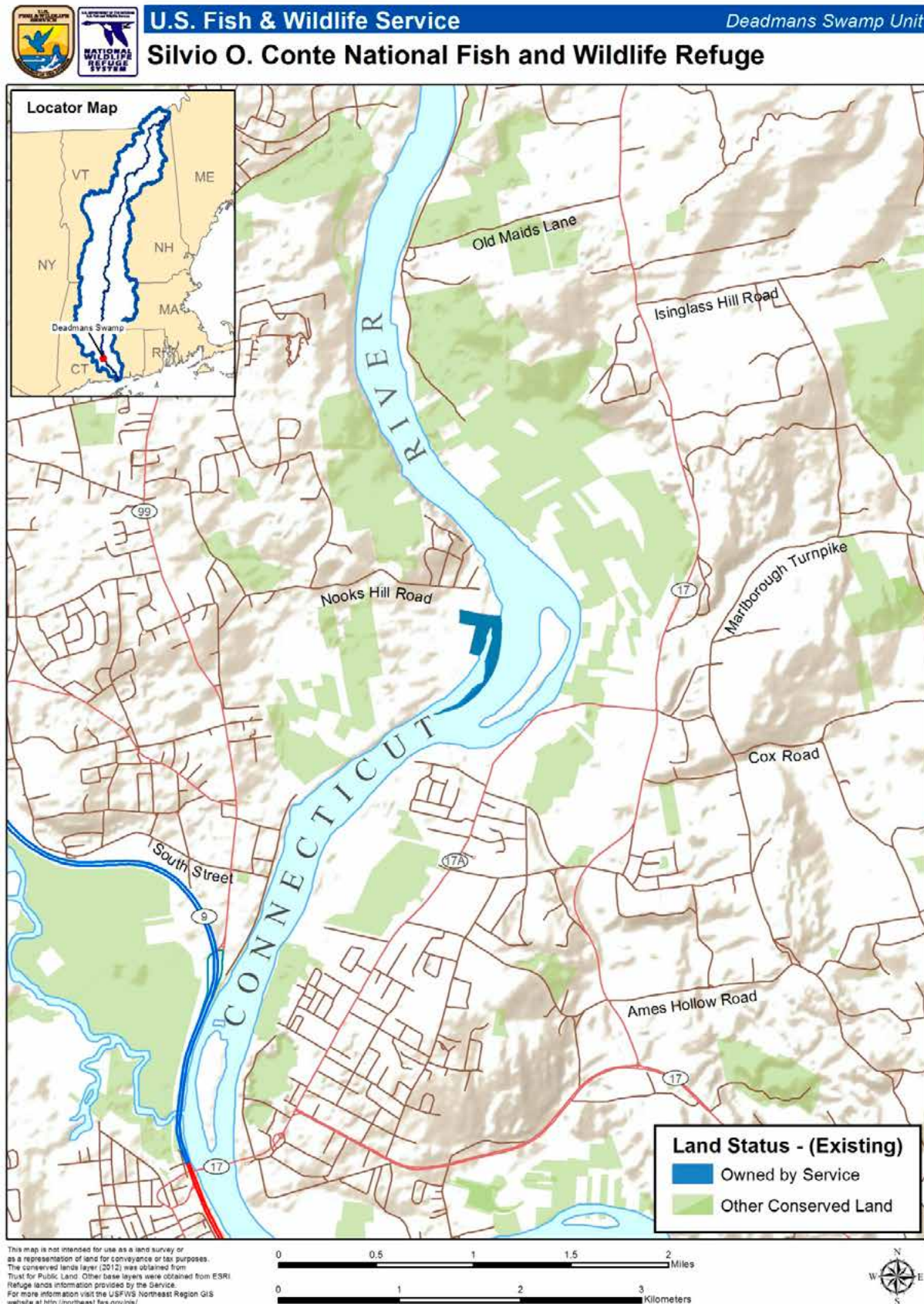
What public use opportunities would likely be a priority on refuge lands within the unit?

The Dead Man's Swamp Unit is closed to the public to protect the federally threatened Puritan tiger beetle.

Does the unit have special ecological, cultural, or recreational features or designations of regional, State, or local importance?

As mentioned above, the Dead Man's Swamp Unit supports the federally threatened Puritan tiger beetle.

Map A.17. Dead Man's Swamp Unit – Location.



Map A.18. Dead Man's Swamp Unit – Habitat Types.

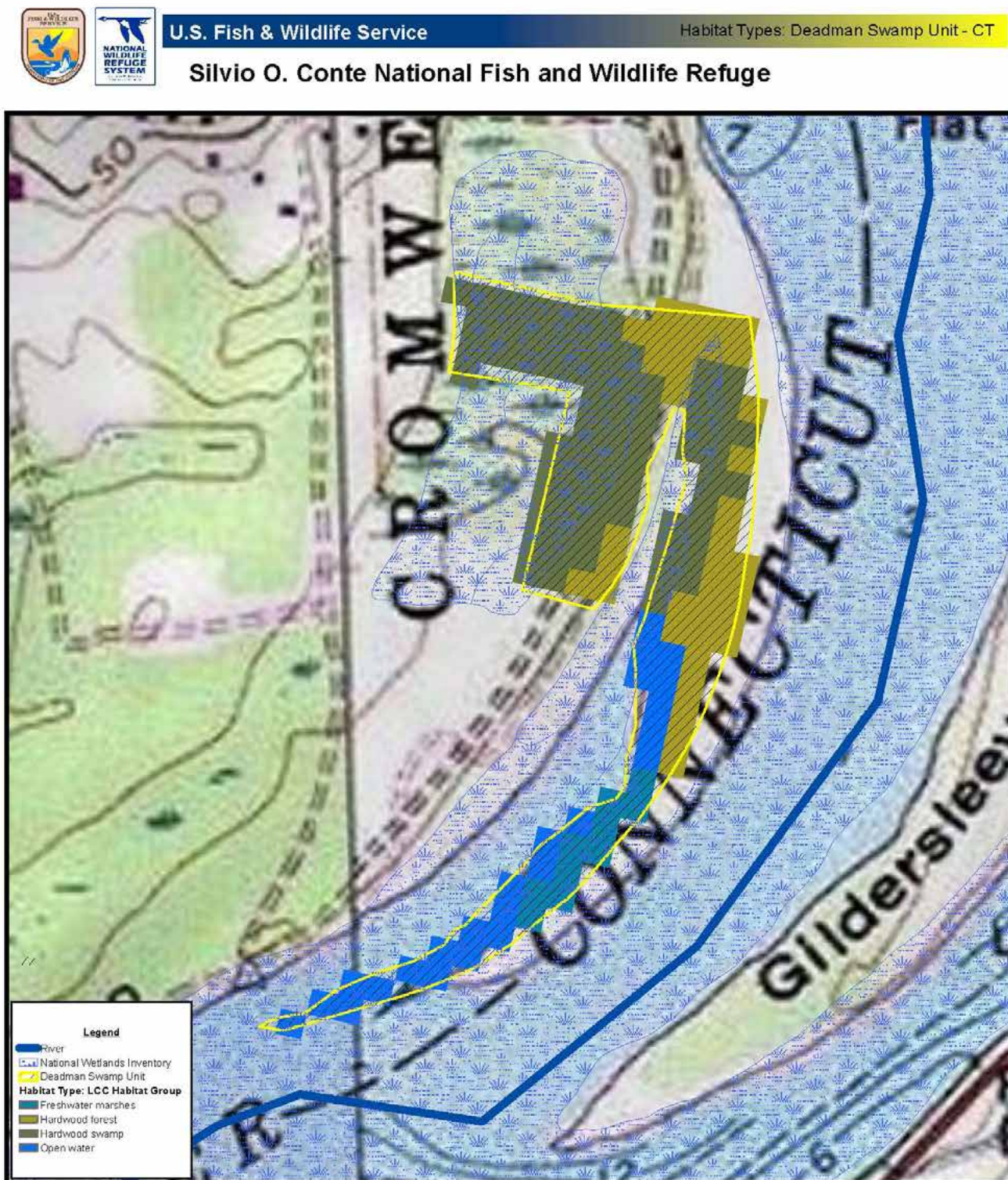


Table A.16. Dead Man's Swamp Unit – Habitat Types.

LCC General Habitat Type ¹	Unit	
	Total Acres	Percent Unit
Forested Uplands and Wetlands²		
Hardwood forest	8	25.5%
Hardwood swamp	15	49.6%
<i>Forested uplands and wetlands subtotal</i>	<i>23</i>	<i>75.2%</i>
Non-forested Uplands and Wetlands²		
Freshwater marshes	2	7.3%
<i>Non-forested uplands and wetlands subtotal</i>	<i>2</i>	<i>7.3%</i>
Inland aquatic habitats²		
Open Water	5	17.5%
<i>Inland aquatic habitats subtotal</i>	<i>5</i>	<i>17.5%</i>
TOTAL	30	100.0%

**All acreages are based upon GIS analysis and should be considered estimates

1 - North Atlantic Landscape Conservation Collaborative general habitat typings for USFWS representative species; linked to the National Vegetation Classification System (NVCS). See table A.52 at the end of this appendix for a comparison of these generalized habitat types with the more specific The Nature Conservancy's Northeastern Terrestrial Habitat Classification System. More detailed habitat tables that include the Northeastern Terrestrial Habitat Classification System habitat types are available for each CFA and refuge unit online at: http://www.fws.gov/refuge/Silvio_O_Conte/what_we_do/conservation.html.

2 - CCP Objective from Silvio O. Conte NFWR Draft CCP/EIS, Chapter 4, Alternative C-Service's Preferred Alternative

Goals, Objectives, and Strategies for the Dead Man's Swamp Unit under Alternative C

Goal 1: Wildlife and Habitat Conservation: Promote the biological diversity, integrity, and resiliency of terrestrial and aquatic ecosystems within the Connecticut River watershed in an amount and distribution that sustains ecological function and supports healthy populations of native fish, wildlife, and plants, especially Federal trust species of conservation concern, in anticipation of the effects of climate, land use, and demographic changes.

Objective 1.1: Forested Uplands and Wetlands

Sub-objective 1.1a (Biological Integrity, Biological Diversity, and Environmental Health)

Where a focal species has not been identified, protect and restore habitats that contribute to the biological integrity, diversity, and environmental health of refuge lands and the Connecticut River watershed.

Rationale:

Dead Man's Swamp's small size and isolation from other refuge units, has led us to aggregate our objectives and discussion under a single sub-objective that addresses the Unit's contribution to the biological integrity, biological diversity, and environmental health of the wider Connecticut River watershed. The Service has policy for maintaining and restoring, where appropriate, refuges' "biological integrity, diversity, and environmental health" (601 FW 3). This policy provides refuge managers with a process to analyze their refuge and recommend the best management direction to prevent further degradation of environmental conditions; and where appropriate, restore lost or severely degraded components. The policy suggests using historic conditions as a reference for comparing the ecosystem's current composition, structure, and functioning to what it was prior to substantial human related changes to the landscape. This comparison can be used to direct management to maintain or restore those natural conditions, to the extent practicable, without jeopardizing refuge purposes. For example, we consider the natural timing and frequency of disturbances, such as fires and flooding, and mimic those processes. In other words, the policy is intended to induce management for native fish, wildlife, and plants and their habitats in natural conditions, and with natural processes, using historic conditions to help identify such conditions and processes (Paveglio et al. 2010). However, we recognize that it is not always possible or desirable to try to mimic historic conditions, particularly in the face of predicted climate and land use changes and other landscape-scale considerations. Historic conditions are only one of many considerations when making decisions about how to manage refuge resources.

Conservationists often use the metaphor of coarse filters and fine filters to convey two complementary strategies for maintaining biological diversity, biological integrity, and environmental health: the first focuses on conserving ecosystems and the second focuses on species (Noss 1987, Hunter 1991, Groves 2003). The coarse-filter approach seeks to protect a representative array of natural ecosystems and their constituent processes, structures, and species (the refuge); however, some species fall through its pores, and coarse filters must be complemented by fine filter strategies tailored to fit particular species (priority species of concern). Sub-objectives throughout this plan generally represent a fine-filter approach—identifying species and their habitats that the USFWS has identified as priorities based upon our establishing legislation, refuge system mission, regional and national conservation plans, and conversations with conservation partners. In contrast, this sub-objective outlines Unit management that will benefit many species, the majority of which will not receive the special, tailored attention of fine-filter conservation. The BIDEH policy guidance complements coarse-filter conservation in ways that fine-filter conservation misses.

The key idea of BIDEH conservation is that most ecosystems contain certain features that are critical to the welfare of many species; thus, conserving those features can have a positive effect on a large suite of species (biological diversity). Logs in a forest, hedgerows in an agricultural landscape, and streams and pools in many terrestrial ecosystems are all examples of ecosystem features that support far more species than one would predict based on their size alone. The importance of conserving these features is widely recognized, but in an ad hoc, idiosyncratic fashion that often does not recognize the commonality between maintaining a hedgerow, a rock outcrop, and an herbaceous wetland. BIDEH conservation overlaps with many aspects of matrix management and ecosystem management (Lindenmayer and Franklin 2002). A key difference is its specific focus on ecosystem elements, which explicitly complements coarse-filter and fine-filter conservation.

Habitats that occur within the Dead Man's Swamp Unit where species-specific management guidelines are not identified will be managed under the umbrella BIDEH policy. These habitats, by virtue of refuge land ownership, represent small or isolated occurrences, but are important in maintaining connectivity within the larger forested matrix, and provide additional structural and species diversity to the matrix. A riverine sand spit along the Connecticut River main stem or a central hardwood swamp, for instance, are anomalies in an otherwise forested landscape. They often have a special flora and fauna—providing sand and clay deposits for larval Puritan tiger beetles, or quaking swamps for secretive bird species. One could make the case that these habitats are small, independent ecosystems, but they are really too small to be candidates for a classic coarse-filter strategy and thus best considered in a BIDEH context.

Some habitats within the Unit will be managed under a fine filter approach—primarily those areas where the Federally-listed Puritan tiger beetle has been documented. USFWS policy requires species-specific management efforts in the case of rare, threatened, or endangered species (see sub-objective 1.3a).

Combining coarse and fine-scale conservation efforts under the rubric of BIDEH will allow the conservation of large numbers of species, the majority of which are too poorly known to be conserved individually, and more targeted strategies for those rare, threatened, or endangered species like the Puritan tiger beetle. Together, the multiple strategies are reasonably comprehensive because all species and habitats known to be in jeopardy will receive needed attention.

The negative consequences of habitat loss and fragmentation to aspects of biological integrity, diversity and health have been shown by a large number of theoretical and empirical studies, in different environments, and for a large array of taxa (Fahrig 2003). Our understanding of the current condition of all the habitats considered under this sub-objective and their contribution to the BIDEH of the CFA is poor. A comprehensive forest and wildlife habitat inventory will be necessary to inform more detailed management strategies that provide the full range of natural processes.

Management Strategies:

Within 3 years of CCP approval

- Work with partners to develop and begin implementation of actions to conserve the existing Puritan tiger beetle metapopulation that includes the Deadmans Swamp Unit. This should include identifying potentially suitable sandy beach habitat, land protection options for suitable habitats, actions that will contribute to recovery, and management of Service lands to complement tiger beetle recovery efforts.

Within 5 years of CCP approval:

- Ensure a diversity of native species is present and non-native species are excluded or managed to keep population levels as low as possible

Inventory and Monitoring Strategies:

Within 5 years of CCP approval:

- Conduct habitat and wildlife inventories
- Map natural communities; protect rare or exemplary examples

Objective 1.3: Inland Aquatic Habitats

Sub-objective 1.3a. (Open Water and River Shore)

In collaboration with partners, identify and implement habitat restoration opportunities to provide sparsely vegetated or open sandy beaches for Puritan tiger beetles.

Rationale:

The Puritan tiger beetle was listed as threatened by the U.S. Fish and Wildlife Service on August 7, 1990 due to declining range and threats from habitat loss and degradation. There are two metapopulations, one on the Chesapeake Bay in Maryland and the other in New England. The recovery of the New England population requires at least three metapopulations, two of which must be large (i.e. 500 to 1,000+ adults) (USFWS 1993). Currently, there is a single metapopulation in Cromwell, Connecticut that meets this criterion occupying four satellite sites; three of which are privately owned and not protected. The fourth site was purchased by the Service in 2005 as the Deadman's Swamp Unit of the Conte Refuge.

This metapopulation been are monitored by by CT DEEP since 1991 and appears to be stable, but has not expanded. A site visit with partners in 2011, determined that vegetation and silt are impacting tiger beetle populations on the southern portion of the Unit, and very few adults have been observed. Removal of this vegetation will be necessary to provide appropriate tiger beetle habitat.

The Service contracted surveys in Connecticut to evaluate potentially suitable habitat for reintroductions (Kapitulik 2009). Of the surveyed sites, Higganum Meadows and Windsor Islands, both owned by the state are considered suitable for reintroduction. These sites, along with proven larval translocation protocols, offer an opportunity to establish two additional metapopulations as required by Recovery Criterion 3 (USFWS 1993). We will continue to work with partners to manage habitats to maintain and increase tiger beetles at the Cromwell location and take steps to establish two additional Connecticut metapopulations.

Management Strategies:

Continue to:

- Work with partners to manage beach habitats to benefit Puritan tiger beetles which includes hand-pulling or herbicide application to encroaching vegetation in Puritan tiger beetle larval habitat.
- Continue to support Puritan tiger beetle research opportunities.

Inventory and Monitoring Strategies:

Continue to:

- Work with partners to monitor Puritan tiger beetle populations.
- Work with partners to educate the general public about recreational use impacts on Puritan tiger beetle populations using outreach, visitor contact, restricted access and other tools, as warranted.
- Partner with CT DEEP and other partners to establish two additional meta-populations as called for in the Recovery Plan.

Goal 2: Education, Interpretation, and Outreach: Inspire residents and visitors to actively participate in the conservation and stewardship of the exceptional natural and cultural resources in the Connecticut River watershed, and promote a greater understanding and appreciation of the role of the Silvio O. Conte National Fish and Wildlife Refuge in conserving those resources.

This goal is not applicable to this unit because it is closed to all public access, except by special use permit, to protect the federally threatened Puritan tiger beetle.

Goal 3: Recreation: Promote high-quality, public recreational opportunities in the Connecticut River watershed that are complementary between ownerships and which provide regional linkages with emphasis on promoting wildlife-dependent activities that connect people with nature.

This goal is not applicable to this unit because it is closed to all public access, except by special use permit, to protect the federally threatened Puritan tiger beetle.

Overview Roger Tory Peterson Unit (Existing Refuge Unit)

Old Lyme, Connecticut

Total Unit Acres ¹	56
-------------------------------	----

¹Actual acres

What are the priority habitat types within the proposed unit? What percentage of the total unit acreage do they represent?

- Hardwood forest - 89%
- Salt marsh – 3%

What are the Federal trust and other natural resource values in the unit?

1. Migratory Birds

The Connecticut River watershed is a major migration corridor. The lower portion of the watershed (CT and MA) receives higher use by migrants, with use concentrated in habitats along the Connecticut River main stem (Smith College 2006). The Roger Tory Peterson Unit is in close proximity to the Connecticut River, and though small in acreage, the forest and wetlands are important stopover habitat for land birds.

What habitat management activities would likely be a priority on the unit?

- Manage invasive plants to maintain native diversity.

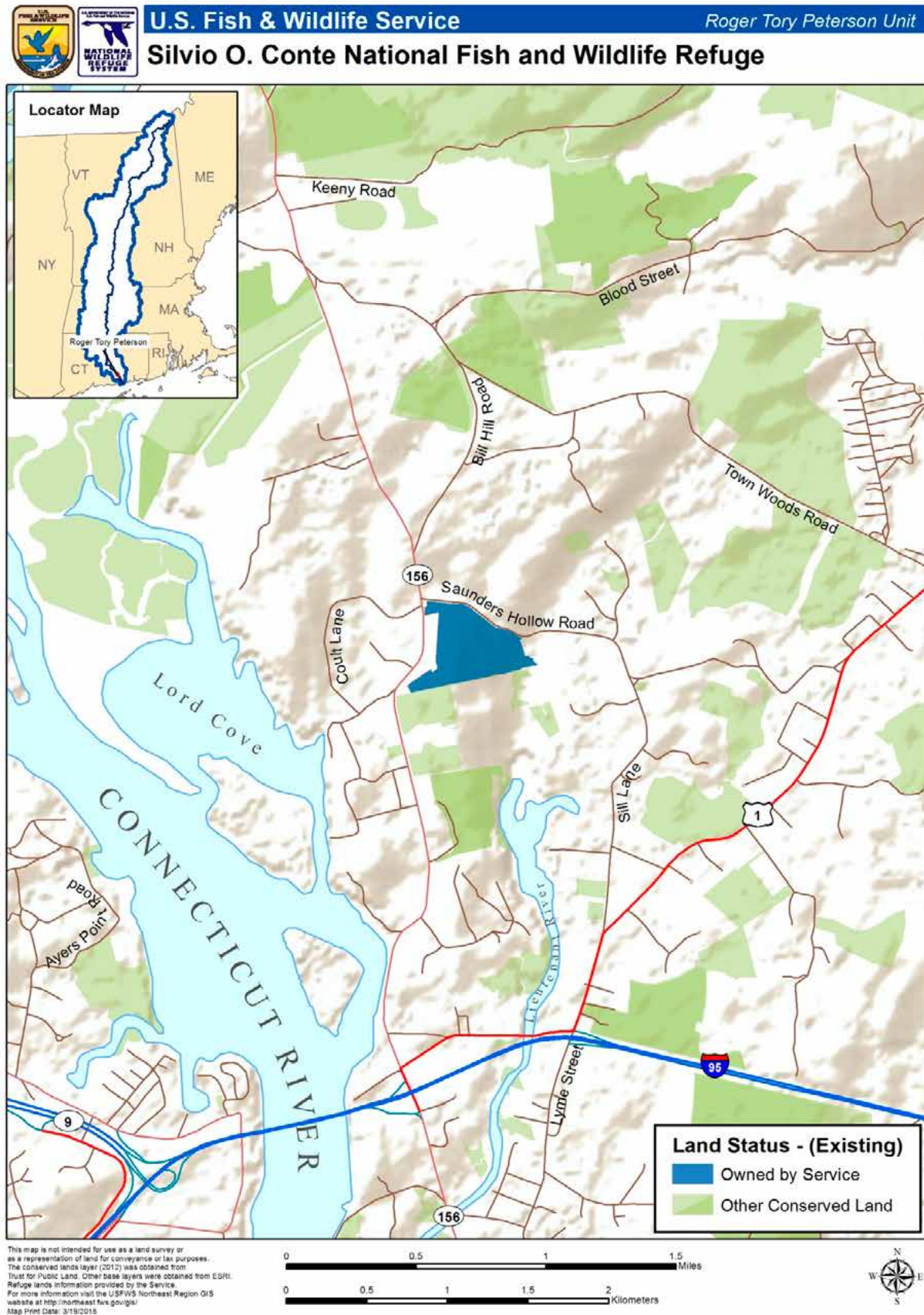
What public use opportunities would likely be a priority on the unit?

The main focus our visitor services program at this unit would be interpretation and wildlife observation and photography. We plan to work with partners to develop interpretive materials about Roger Tory Peterson and his importance as a naturalist, educator, ornithologist, and wildlife artist. We also plan to construct an ADA-accessible nature trail on the unit.

Does the unit have special ecological, cultural, or recreational features or designations of regional, State, or local importance?

The unit contains a small house that served as Roger Tory Peterson's office and an adjacent small garage. Peterson was a renowned naturalist, ornithologist, artist, and educator, best known for his series of successful nature field guides.

Map A.19. Roger Tory Peterson Unit – Location.



Map A.20. Roger Tory Peterson Unit – Habitat Types.

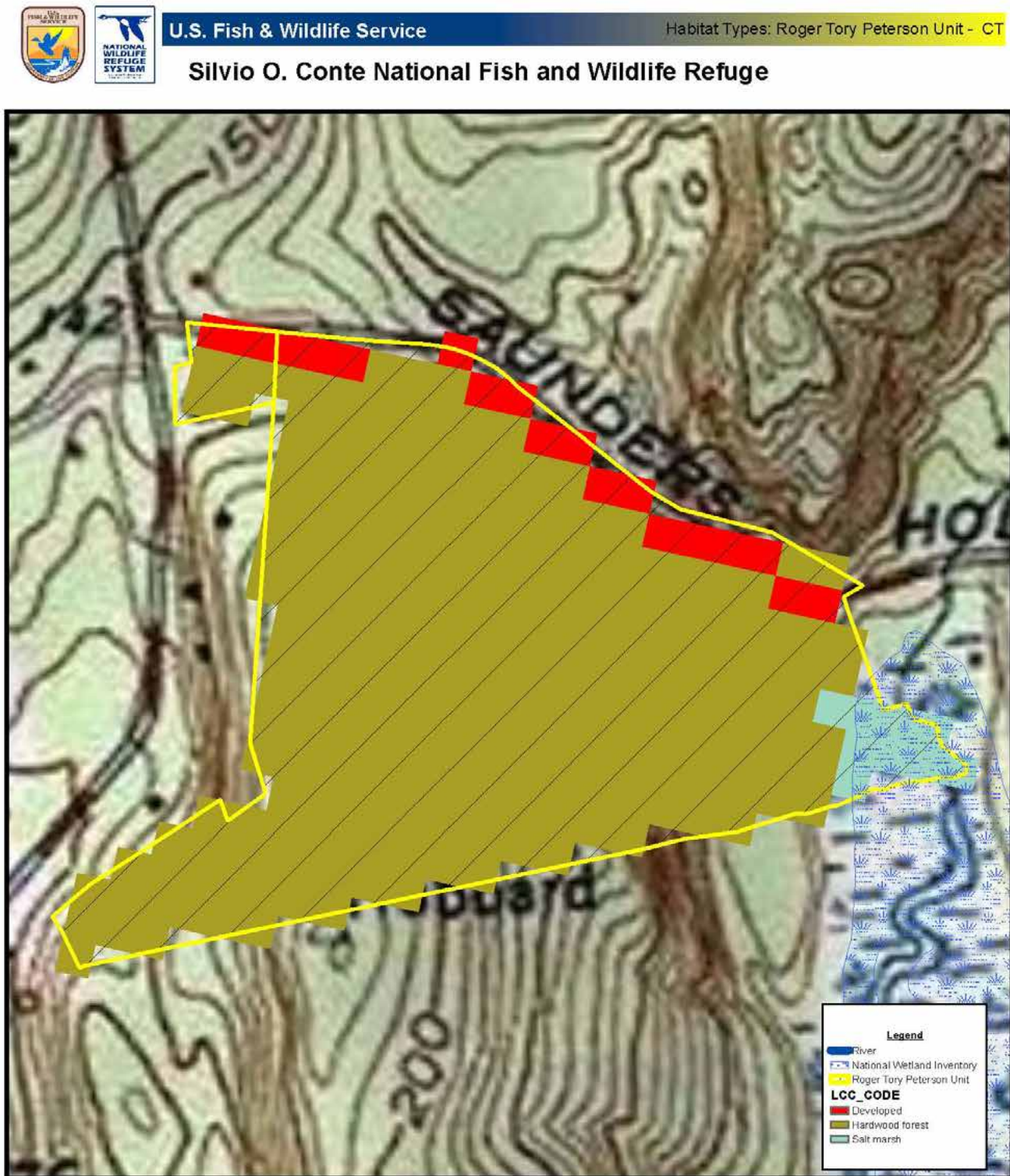


Table A.17. Roger Tory Peterson Unit – Habitat Types.

LCC General Habitat Type ¹	Unit	
	Total Acres	Percent Unit
Forested uplands and wetlands²		
Hardwood forest	50	89.3%
<i>Forested uplands and wetlands subtotal</i>	50	89.3%
Coastal wetlands and aquatic habitats²		
Salt marsh	2	3.6%
<i>Coastal wetlands and aquatic habitats subtotal</i>	2	3.6%
Other		
Developed	4	7.1%
<i>Other subtotal</i>	4	7.1%
TOTAL	56	100.0%

**All acreages are based upon GIS analysis and should be considered estimates

1 - North Atlantic Landscape Conservation Collaborative general habitat typings for USFWS representative species; linked to the National Vegetation Classification System (NVCS). See table A.52 at the end of this appendix for a comparison of these generalized habitat types with the more specific The Nature Conservancy's Northeastern Terrestrial Habitat Classification System. More detailed habitat tables that include the Northeastern Terrestrial Habitat Classification System habitat types are available for each CFA and refuge unit online at: http://www.fws.gov/refuge/Silvio_O_Conte/what_we_do/conservation.html.

2 - CCP Objective from Silvio O. Conte NFWR Draft CCP/EIS, Chapter 4, Alternative C-Service's Preferred Alternative

Goals, Objectives, and Strategies for the Roger Tory Peterson Unit under Alternative C

Goal 1: Wildlife and Habitat Conservation: Promote the biological diversity, integrity, and resiliency of terrestrial and aquatic ecosystems within the Connecticut River watershed in an amount and distribution that sustains ecological function and supports healthy populations of native fish, wildlife, and plants, especially Federal trust species of conservation concern, in anticipation of the effects of climate, land use, and demographic changes.

Objective 1.1: Forested Uplands and Wetlands

Sub-objective 1.1a. (Biological Integrity, Biological Diversity, and Environmental Health)

Where a focal species has not been identified, protect and restore habitats that contribute to the biological integrity, diversity, and environmental health of refuge lands and the Connecticut River watershed.

Rationale:

The Roger Tory Peterson Unit's small size and isolation from other refuge units has led us to aggregate our objectives and discussion under a single sub-objective that addresses the unit's contribution to the biological integrity, biological diversity, and environmental health of the wider Connecticut River watershed. The Service has policy for maintaining and restoring, where appropriate, refuges' "biological integrity, diversity, and environmental health" (601 FW 3). This policy provides refuge managers with a process to analyze their refuge and recommend the best management direction to prevent further degradation of environmental conditions; and where appropriate, restore lost or severely degraded components. The policy suggests using historic conditions as a reference for comparing the ecosystem's current composition, structure, and functioning to what it was prior to substantial human related changes to the landscape. This comparison can be used to direct management to maintain or restore those natural conditions, to the extent practicable, without jeopardizing refuge purposes. For example, we consider the natural timing and frequency of disturbances, such as fires and flooding, and mimic those processes. In other words, the policy is intended to induce management for native fish, wildlife, and plants and their habitats in natural conditions, and with natural processes, using historic conditions to help identify such conditions and processes (Paveglio et al. 2010). However, we recognize that it is not always possible or desirable to try to mimic historic conditions, particularly in the face of predicted climate and land use changes and other landscape-scale considerations. Historic conditions are only one of many considerations when making decisions about how to manage refuge resources.

Conservationists often use the metaphor of coarse filters and fine filters to convey two complementary strategies for maintaining biological diversity, biological integrity, and environmental health: the first focuses on conserving ecosystems and the second focuses on species (Noss 1987, Hunter 1991, Groves 2003). The coarse-filter approach seeks to protect a representative array of natural ecosystems and their constituent processes, structures, and species (the refuge); however, some species fall through its pores, and coarse filters must be complemented by fine filter strategies tailored to fit particular species (priority species of concern). Sub-objectives throughout this plan generally represent a fine-filter approach—identifying species and their habitats that the USFWS has identified as priorities based upon our establishing legislation, refuge system mission, regional and national conservation plans, and conversations with conservation partners. In contrast, this sub-objective outlines CFA management that will benefit many of its species, the majority of which will not receive the special, tailored attention of fine-filter conservation. The BIDEH policy guidance complements coarse-filter conservation in ways that fine-filter conservation misses.

The key idea of BIDEH conservation is that most ecosystems contain certain features that are critical to the welfare of many species; thus, conserving those features can have a positive effect on a large suite of species (biological diversity). Logs in a forest, hedgerows in an agricultural landscape, and streams and pools in many terrestrial ecosystems are all examples of ecosystem features that support far more species than one would predict based on their size alone. The importance of conserving these features is widely recognized, but in an ad hoc, idiosyncratic fashion that often does not recognize the commonality between maintaining a hedgerow, a rock outcrop, and an herbaceous wetland. BIDEH conservation overlaps with many aspects of matrix management and ecosystem management (Lindenmayer and Franklin 2002). A key difference is its specific focus on ecosystem elements, which explicitly complements coarse-filter and fine-filter conservation.

Habitats that occur within the Roger Tory Peterson where species-specific management guidelines are not identified will be managed under the umbrella BIDEH policy. These habitats are most often small or isolated occurrences, but are important in maintaining connectivity within the larger forested matrix, and providing additional structural and species diversity to the matrix. Salt marsh and rocky outcrops, for instance, are anomalies in an otherwise forested landscape. They often have a special flora and fauna—providing sunny, dry sites for reptiles to bask, or tidal waters that support brackish grasses and plants. One could make the case that these outcrops are small, independent ecosystems, but they are really too small to be candidates for a classic coarse-filter strategy and thus best considered in a BIDEH context. The same is true when the refuge may own a limited example of a larger ecosystem, as in the case of the salt marsh within the Unit. This approach will allow the conservation of large numbers of species, the majority of which are too poorly known to be conserved individually (e.g., imagine species conservation plans for particular insects or liverworts). Together, the multiple strategies are reasonably comprehensive because all species and habitats known to be in jeopardy will receive needed attention.

The negative consequences of habitat loss and fragmentation to aspects of biological integrity, diversity, and health have been shown by a large number of theoretical and empirical studies, in different environments, and for a large array of taxa (Fahrig 2003). Our understanding of the current condition of all the habitats considered under this sub-objective and their contribution to the BIDEH of the CFA is poor. A comprehensive forest and wildlife habitat inventory will be necessary to inform more detailed management strategies that provide the full range of natural processes.

Management Strategies:

Within 5 years of CCP approval:

- Ensure a diversity of native species is present and non-native species are excluded or managed to keep population levels as low as possible.
- Work with partners, including the State of Connecticut, in support of the State Wildlife Action Plan, to ensure management on Service lands complement adjacent land management objectives.

Inventory and Monitoring Strategies:

Within 5 years of CCP approval:

- Conduct habitat and wildlife inventories.
- Map natural communities; protect rare or exemplary examples.
- Monitor impacts to sensitive habitats from the introduction of trail users.

Goal 2: Education, Interpretation, and Outreach: Inspire residents and visitors to actively participate in the conservation and stewardship of the exceptional natural and cultural resources in the Connecticut River watershed, and promote a greater understanding and appreciation of the role of the Silvio O. Conte National Fish and Wildlife Refuge in conserving those resources.

Objective 2.1: Environmental Education

In collaboration with public and private educators from all four states in the watershed, lead or facilitate the implementation of structured natural and cultural resource curricula, with a focus on guiding educators and students to develop an awareness of, and concern about, natural and cultural resources and associated challenges; appreciate our conservation history; make informed decisions and work individually or collectively toward solutions; and model responsible environmental stewardship in their everyday lives.

Sub-objective 2.1a. (Environmental Education Planning and Training)

Provide support to the Friends group who will act as a resource to communities, school systems, public and non-profit organizations, and private educational organizations in Connecticut, who want to use the Peterson Unit as an outdoor environmental education classroom.

Rationale:

The 56-acre Peterson Unit was once owned by renowned naturalist, Roger Tory Peterson. Located in Old Lyme, Connecticut, the site offers visitors a chance to see hardwood forests mixed with riparian wetlands along the western boundary of the Lieutenant River. Located on the property is a small house, the York House, used by Roger Tory Peterson as an office. The forming Friends group, and local residents would like to see this site developed into a small visitor contact station to interpret the life and work of Roger Tory Peterson, as well as the larger Conte Refuge. The refuge supports this vision.

Environmental education is an important tool that can be used to spread the refuge message to private residents throughout the watershed, including to residents surrounding the Peterson Unit in Connecticut. The Peterson Unit has a small house on it, the York House, which was once used by Roger Tory Peterson as an office. This facility will be able to host students from the surrounding area participating in environmental education and educate them not only about refuge purposes, but also about the work of Roger Tory Peterson, a great naturalist. Because the Peterson Unit does not have full time visitor services staff, most environmental education efforts will be conducted through volunteers, Friends members, and partners.

Management Strategies:

Within 5 years of CCP approval:

- Develop a cadre of volunteers and partners that can lead educational visits from local schools.
- Promote the Peterson Unit as a destination for field trips and increase the number of students by two percent per year for the next 5 years.
- Develop educational partnerships with at least one local school to use the unit as an outdoor classroom emphasizing migratory birds, the Peterson legacy, hardwood forests, and riparian areas.
- Encourage partners to develop an evaluation system to measure the effectiveness of environmental education programs.
- Encourage and support Friends group to work with local schools to develop experiential learning programs focusing on hardwood forests, riparian wetlands, the Peterson legacy, and migratory birds that contribute to Connecticut curriculum standards.
- Make environmental education training available to volunteers and Friends group members.

Within 10 years of CCP approval:

- Offer the Peterson Unit as an outdoor classroom.

Sub-objective 2.1b. (Environmental Education Delivery)

Promote other government agencies, non-profit organizations, private educational organizations, staff, volunteers, and members of the Friends of Peterson to offer high quality EE programs at the Peterson Unit.

Rationale:

See rationale for sub-objective 2.1a.

Management Strategies:

Within 5 years of CCP approval:

- Work through volunteers and members of Friends group to facilitate teachers and students at the Peterson Unit.
- Work with local environmental education providers to implement the refuge's Adopt-a-Habitat initiative to help individuals learn about and connect with their local environments;
- Work with Friends of Conte Recreation and Education sub-committee to support and recruit partners that seek funding for watershed-based environmental education.

Objective 2.2: Interpretation

Develop, lead, and facilitate interpretive programs that emotionally and intellectually connect the audience to natural and cultural resources in the watershed.

Sub-objective 2.2a. (Natural and Cultural Resource Interpretive Planning and Training)

Encourage and support Friends group to work with communities, public and non-profit organizations, staff, and volunteers to offer quality interpretive programming at the Peterson Unit. The development of highly trained interpreters will be encouraged by offering interpretive training to Friends' members, partners, and volunteers on a regular basis.

Rationale:

See the rationale in chapter 4 detailing the importance of interpretation for the Service. Interpretation is an important tool that can help refuge visitors and local residents appreciate the importance of this area to the larger watershed. The Peterson Unit will provide ample opportunities to not only interpret the refuge but to also interpret the great work of the world renowned naturalist Roger Tory Peterson. The York House which served as Dr. Peterson's office will offer visitors a glimpse of his work life. In addition, the habitats and wildlife that inhabit the land at the Peterson Unit will be the basis for many important stories to deliver to visitors from near and far.

Management Strategies:

Within 5 years of CCP approval:

- Develop more detailed interpretive objectives and strategies as part of a Visitor Services Plan.
- Coordinate with state to provide resources and trainings to Friends, and volunteers in support of interpretive programs.
- Collaborate with the Friends group and volunteers to create meaningful, consistent, thematic statements to be used in the delivery of programming at the Peterson Unit.
- Work with Friends group and other partners to employ a variety of themed interpretive offerings (e.g., presentations, audio-visual programs, print and social media, signs, and exhibits) when creating programming for natural and cultural resource interpretation.

Within 10 years of CCP approval:

- Develop self-guided interpretive services, such as interpretive trails and kiosks, exhibits, and printed media.

Within 5 years of CCP approval:

- Build an evaluation process that includes formal and informal evaluation to assess the effectiveness of all interpretation programs.

Sub-objective 2.2b. (Natural and Cultural Resource Interpretive Program Delivery)

Collaborate with Friends group and volunteers to deliver quality natural and cultural resource interpretive programs.

Rationale:

See rationale for sub-objective 2.2a.

Management Strategies:

Within 5 years of CCP approval:

- Through Friends group and other partners, annually provide quality interpretive programs, exhibits, and printed media at the Peterson Unit.
- Initiate a "refuge host" program, or utilize SCA interns and volunteers to provide personal contacts at the visitor contact station to initiate discussion and answer questions.
- Incorporate thematic statements, measureable objectives, and evaluation measures into all interpretation efforts.

- Publicize interpretive programs through traditional media, on the refuge web site, and digital social media conduits.
- Maintain a supply of print interpretive brochures, i.e., general brochure and bird checklist that incorporate refuge interpretive messages and themes.

Within 10 years of CCP approval:

- Contribute refuge interpretive information for scenic byways and other state publications and signs.
- Develop self-guided interpretive messages and use state of the art as well as traditional media (e.g., brochures).

Objective 2.3: Public and Community Outreach

Support, promote, and coordinate a wide range of outreach tools and activities to facilitate and improve communications and relationships with the American public, especially communities, adjacent landowners, and elected officials in the Connecticut River watershed, and to empower citizens to recognize and resolve local natural resource issues and promote conservation and the responsible use of natural resources.

Although the Peterson Unit is unstaffed there may be opportunities to use the York House and a future trail for interpretation and events that honor his life and work.

Objective 2.4: Science and Technical Outreach

Facilitate the collection and exchange of information that increases the knowledge and understanding of natural and cultural resources, addresses climate change and other conservation issues, and provides land managers with better information to make management decisions affecting resources.

Because the Peterson Unit is unstaffed and does not have refuge facilities, science and technical outreach for this site will occur through regular outreach activities at the headquarters and will not specifically occur at this site.

Goal 3: Recreation: Promote high-quality, public recreational opportunities in the Connecticut River watershed that are complementary between ownerships and which provide regional linkages with emphasis on promoting wildlife-dependent activities that connect people with nature.

Objective 3.1: Hunting

This objective is not applicable because the Roger Tory Peterson Unit is a 56-acre parcel in a rural portion of the town of Old Lyme. Hunting on this unit is not being proposed because it was not previously allowed, the adjacent landowners do not allow hunting, and it is in close proximity to houses.

Objective 3.2: Fishing

Support quality, public fishing opportunities in the Connecticut River watershed to promote an understanding and appreciation of natural resources and their management on lands and waters, while also protecting a traditional outdoor pastime deeply rooted in the America's natural heritage and conservation history.

This objective is not applicable because the Roger Tory Peterson Unit is a 56-acre parcel in a rural portion of the town of Old Lyme without suitable fishing opportunities. The Lieutenant River forms part of the eastern boundary; however, the riparian area is comprised of dense, tall vegetation that makes it virtually inaccessible from the refuge.

Objective 3.3: Wildlife Observation and Photography

Support quality, public opportunities to observe and photograph wildlife in the Connecticut River watershed in a variety of natural habitats to connect a broad spectrum of people with nature.

Sub-objective 3.3a. (Infrastructure and Access for Wildlife Observation and Photography)

Provide quality opportunities for wildlife observation and photography at the Roger Tory Peterson Unit.

Rationale:

Wildlife viewing and photography is a priority public use on national wildlife refuges and a popular recreational activity in this part of the state. Currently, there is no infrastructure in place at this unit to support this use, and consequently, visitation for wildlife viewing and photography is limited. Allowing people to engage in wildlife observation and photography is in keeping with the legacy of Roger Tory Peterson and the nature of the area.

Management Strategies:

Within 1 year of CCP approval:

- Consistent with the final compatibility determination, allow public access at the unit daily from 30 minutes before sunrise to 30 minutes after sunset.
- Add information on the unit to the refuge website.

Within 10 years of CCP approval:

- Develop a public access strategy and required planning (e.g., additional NEPA, compatibility determinations) that includes consideration of developed trails, parking, kiosks, viewing platforms, blinds, interpretation, signage, etc.

Within 15 years of CCP approval:

- Implement the visitor use enhancements identified in the public access strategy and the refuge Visitor Services Plan.

Sub-objective 3.3b. (Wildlife Observation and Photography Aids)

Offer viewing and photography aids that enhance the visitor experience. Use a variety of methods to reach a broad spectrum of people. Work closely with the friends group and other partners who host events designed to view wildlife on the unit.

Rationale:

The entire unit would be available for wildlife observation and photography; however, there are steps the refuge can take to enhance their time on the unit. Visitation increases are expected as this unit becomes better known and because of its connection to the Roger Tory Peterson legacy. By providing new visitors a quality experience they are more likely to return and share their experiences with others. One way to accomplish this is to offer sufficient information to attract a variety of visitors through a variety of media.

Management Strategies:

Within 1 year of CCP approval:

- Add information on the unit to the refuge website.

Within 5 years of CCP approval:

- Produce a wildlife and plant species guide for the Roger Tory Peterson Unit that will be available on the refuge website, at the refuge headquarters.
- Install an informational kiosk in a conspicuous location to post information and notices to visitors.

Sub-objective 3.3c. (Watershed-based Partner Initiatives)

Not applicable

Objective 3.4: Other Recreational Activities

In order to reach a broader demographic, support non-priority outdoor recreational opportunities and public access to quality, nature-based experiences throughout the Connecticut River watershed that facilitate and improve community relationships, raise awareness and an appreciation for conserving natural resources, and garner support for the National Wildlife Refuge System.

Sub-objective 3.4a. (Regional Water-based Trail Initiatives and Opportunities Including Refuge Lands)

Not applicable

Sub-objective 3.4b. (Regional Land-based Trail Initiatives and Opportunities Including Refuge Lands)

Not applicable

Sub-objective 3.4c. (Other Appropriate and Compatible Recreational Opportunities That Enhance Visitor Use and Enjoyment of Refuge Lands)

Allow compatible outdoor recreational opportunities on the Roger Tory Peterson Unit that connect people with nature, raise the visibility of the Service and the Refuge System, make the refuge more relevant to the local community, and promote economic activity in the local area.

Rationale:

In addition to the priority public uses, there are other wildlife-dependent, appropriate and compatible recreational activities that can broaden the visitor base, giving people alternative ways to enjoy the natural resources at the unit without detrimentally impacting the wildlife resource.

Management Strategies:

Within 1 year of CCP approval:

- Allow dispersed hiking and snowshoeing.
- Allow pet walking. In order to minimize conflicts with wildlife and other visitors, pets must be on leashes not longer than 10 feet in length.
- Allow recreational gathering of blueberries, blackberries, strawberries, raspberries, mushrooms, fiddleheads, and antler sheds.
- When compatible, allow commercial guiding in support of priority public uses by special use permit.

Within 5 years of CCP approval:

- Work with partners to determine whether a virtual geocache course at the unit is acceptable on the conserved property. The course should integrate orienteering with refuge interpretive messages that include linking this unit to other refuge divisions and units.